bioMérieux

mini VIDAS®

Service Manual

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Updates are made periodically to this document. Software revisions and other changes will be included in subsequent versions.

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PREFACE

This manual is for use by bioMérieux Field Service Engineers and factory trained Biomedical Engineers to assist in the troubleshooting and repair of the mini VIDAS system. Every effort has been made to ensure that the information contained in this manual is complete and accurate. All calibration and adjustment procedures used in this manual are adapted directly from current Engineering documentation or manufacturers' supplied documentation.

Information in this document is subject to change without notice. Should a change to this manual become necessary, revision will be performed in accordance with the applicable bioMérieux Control Procedure and will take place at the Chapter level.

TABLE OF CONTENTS

Chapter One: **Organization of the Manual**

Introduction

This Service Manual contains information on the operation, installation, maintenance, and repair of the mini VIDAS. This information is intended to provide an understanding of how this instrument performs, possible causes of malfunctions, and how to isolate and correct performance problems.

This section explains how the manual is organized, and how to use the manual.

The Table of Contents lists all the chapters in this manual. Each section is subdivided into sections corresponding to a procedure or description.

Organization of the Manual

The information in the manual is organized among eight chapters, arranged so that the information you need first is in the beginning of the manual. Information required for maintenance after the system is operating, is found in later chapters. The following is a brief outline of what you will find:

- Chapter One: Organization of the Manual — This chapter explains how the manual is organized and how to use the manual.

- Chapter Two: Setting Up Your System — This chapter is a complete guide for the installation and setup of the mini VIDAS. It begins with the unboxing of the instrument and proceeds through its power up and configuration. This chapter also contains environmental, space, and electrical requirements, along with instructions for connecting external options.

- Chapter Three: System Overview — Use this chapter to familiarize yourself with the mini VIDAS hardware and the basic parts of the software system. This chapter describes the Reagent Strips and other parts of the assay kits you use with the system.

- Chapter Four: Parts of the System — This chapter describes the components of the system and their operation. It contains the descriptions of the boards and major subassemblies.

- Chapter Five: Internal Installations — This chapter describes how to remove and install the subassemblies that you may encounter during repair of the mini VIDAS. It also contains Mechanical Alignment procedures.

- Chapter Six, A through D: Maintenance — This chapter contains several different types of procedures, for electronic alignment and calibration of subassemblies in the system.

- Chapter Seven, A through G: Troubleshooting — The mini VIDAS has a system for detecting and reporting errors. This chapter describes the error reporting system, the error messages you will see, and how to respond to error conditions.

- Chapter Eight: Preventive Maintenance — This chapter describes how to perform Preventive Maintenance on the mini VIDAS, and provides a checklist that can be used for recordkeeping.

Following these chapters are appendices listing procedures for decontamination and routine cleaning; procedures for performing a VIDAS Quality Control Test (QCT) assay; board layouts and schematics. You will also find a glossary of terms in the back of the manual.

Typographic Conventions

Following are the terms and visual cues used in this manual to aid in your understanding of the procedures.

NOTE: Symbol calls attention to especially useful information or instructions.

WARNING! The information or instructions following is critical to the safe operation of the instrument. ***Please read this information carefully!***

There are 24 keys on the mini VIDAS Keypad. They are divided among five groups, according to the function:

- **↵, or Return key**.
- **Number keys**. A standard set of digits, as you would find on a calculator. In referring to these keys, we use their general name in bold type: **1**
- **Function keys**. Three keys with specially programmed functions. In procedures, these keys are referred to by their individual names, in bold type. For example:

  press **Previous Screen** to return to the menu.

- **Arrow keys.** Four keys used to move the cursor on some screens. The arrow keys are referenced by their direction, in bold type: **UP, DOWN, LEFT**, and **RIGHT.**
- **Selection keys.** Five keys used to select options from the screen. The selection keys are used most often in the operation of the system. The manual therefore uses special conventions for them.

  An operation involving a selection key always begins with "Select." Contrast this with the other keys, where we use the word "press."

  The use of a selection key is always associated with a selection option displayed on the screen.

  A selection reference specifically by name appears in bold type. For example:

  Select: **Utility Menu** on the Main Menu.

  A selection referenced as a general category appears in normal type. For example:

  Select Section A to halt.

- **Commands.** From time to time, this manual will instruct you to enter a command on an external keyboard. An operation involving a command will appear in bold type. For example:

  Type **motor pump** and press **ENTER.**

  press **<Ctrl X>**.

Chapter Two: **Setting Up Your System**

Preparations Before Unpacking

Before unpacking your mini VIDAS, you should prepare a suitable benchtop space for it (see mini VIDAS Specifications). In doing so, remember the following:

- The bench must be level to within 5°.
- The mini VIDAS is 21¼ inches (54 cm) wide, 17¼ inches (44 cm) high, and 21 inches (53 cm) deep.
- There must be at least 2 inches (5 cm) of clearance on each side and on the top, and 4 inches (10 cm) behind.
- You must be able to reach behind the system to access the power switch, cable connections, and memory card slot.
- The front of the system must be totally clear of any obstructions.
- Place the system close enough to an adequate power source, so that the power cord (included) can reach the outlet.
- The ambient temperature in the mini VIDAS location must be 20° to 30°C. Therefore keep the system away from all air vents, direct sunlight, or other objects that could affect temperature performance.

Unpacking the mini VIDAS

WARNING! The mini VIDAS weighs 85 lb. (40 kg). Two people should be used to move the mini Vidas.

- Place the box containing the mini VIDAS on the floor and open the bottom of the carton.

NOTE: Retain the shipping carton and packing materials in case you need to ship the mini VIDAS at a later date.

- Turn over the box over so that the open end of the carton is on the floor. Be sure the flaps are out. Then lift the carton up, away from the mini VIDAS.
- Remove the foam end caps and the anti-static bag.
- Place the instrument on the benchtop.
- Remove the tape securing the dust covers.

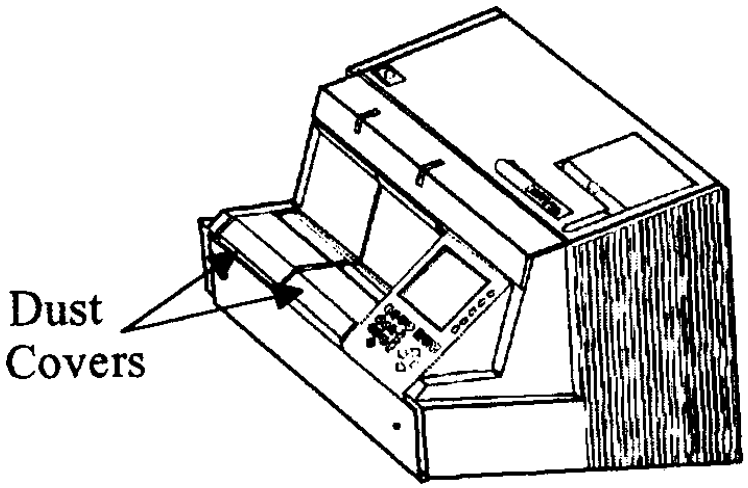


Figure 2-1 mini VIDAS Dust Covers

- Open each dust cover and remove the foam shipping block.

NOTE: The shipping block in Section A, on the left as you face the instrument, has a rod attached to it. This rod, which secures the Scanhead during shipment, must be removed with the shipping block.

mini VIDAS Specifications

CAPACITY	12 single reagent strips 6 double reagent strips
PROCESSING TIME	Assay Dependent (1 to 2 hrs typical)
DETECTOR	Photodiode fluorometer: 370 nm excitation 450 nm detection Range: 40 nanomolar to 40 micromolar Umbelliferone (full scale)
SAMPLE TRANSFER PIPETTE	Volume: 8.9µl to 316.5µl full stroke % CV at volume: 3.5% at 10 µl 3.5% at 100 µl 1.5% at 200 µl
SECTION TEMPERATURE	SPR Block: 37°C ± 1.5°C ±0.5°C matching Block-to-Block Tray: 37°C ± 1.7°C ±0.7°C matching Tray-to-Tray
MECHANICS	Digital stepping motors
ENVIRONMENTAL	Temperature: 20 to 30°C measured 1 inch from unit cover Humidity: 10 to 80% (non-condensing)
ELECTRICAL	Voltage: 100/130 VAC, 1.5 amps (VDE — 100/120 VAC) 200/250 VAC, 0.8 amps (VDE — 200/240 VAC) Frequency: 50/60HZ Fuse Current: 1.5 A. S.B. @ 100 - 130 VAC 1.6 A. S.B. @ 220 - 250 VAC Consumption: 180VA Heat: 256 BTU/HR
DIMENSIONS	HEIGHT: 17.25 inches (44 cm) WIDTH: 21.25 inches (54 cm) DEPTH: 21.0 inches (53 cm) WEIGHT: 85 lbs. (40 kg)

Starting the mini VIDAS

All operating software has been preloaded into the mini VIDAS. To start the mini VIDAS proceed as follows:

- Connect the power cord to the mini VIDAS and an appropriate power outlet (see mini VIDAS Specifications).

☞ **NOTE**: Verify the instrument is at room temperature before applying power.

- Reach behind the instrument and turn the power switch ON (see Figure 2-2). The mini VIDAS will go through a power up and self-test sequence, this involves the following:
  - Hardware self tests. The mini VIDAS exercises all of its motors. During this time, expect to hear noises inside the instrument and observe that the Reagent Trays cycle into the instrument. The instrument also checks its Optics during this sequence.
  - Software boot sequence, self test, and diagnostics. The boot sequence program starts the mini VIDAS software stored in non-volatile RAM on the computer board. Messages similar to following display on the screen:
    - VIC BOOT R1.0
    - Booting
    - Initializing ... Please Wait

☞ **NOTE**: The first time that power is applied to the mini VIDAS, the language selection screen will appear. Select the language you want to use.

- The mini VIDAS **Main Menu** is displayed, completing the startup sequence (see Figure 2-4).
- Select **Utility Menu** from the **Main Menu**. The Utility Menu appears.
- Select **Misc. Functions** from the **Utility Menu**. The Miscellaneous Functions Menu appears.
- Select **Test Menu** from the **Misc. Functions** Menu. The Test Menu appears.
- Select **Keypad Test** from the **Test Menu**. Press all buttons on the Keypad, (see Figure 2-3) and press the ↵ key last. The screen displays **keypad okay** and **press any key to continue**.

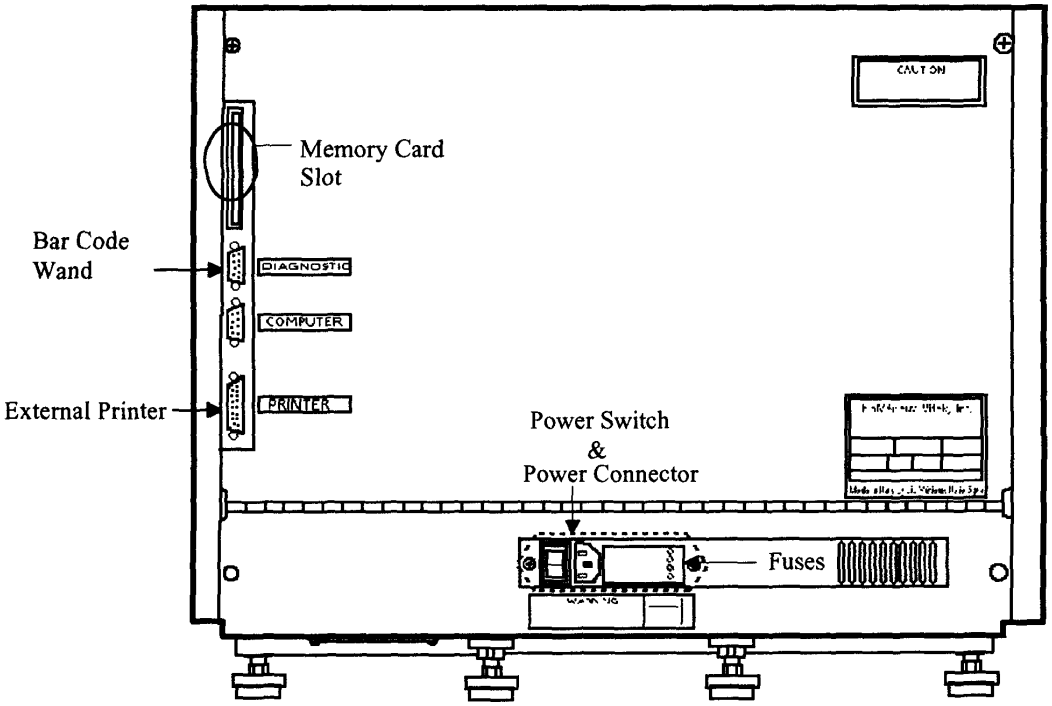


Figure 2-2 Power Switch

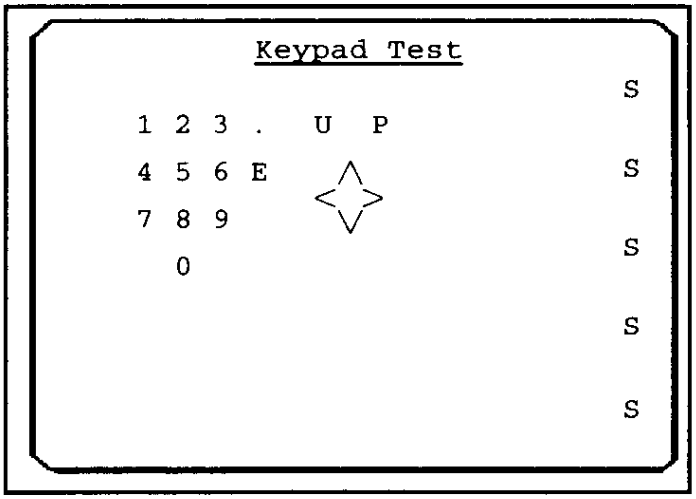


Figure 2-3 Keypad Test Switch

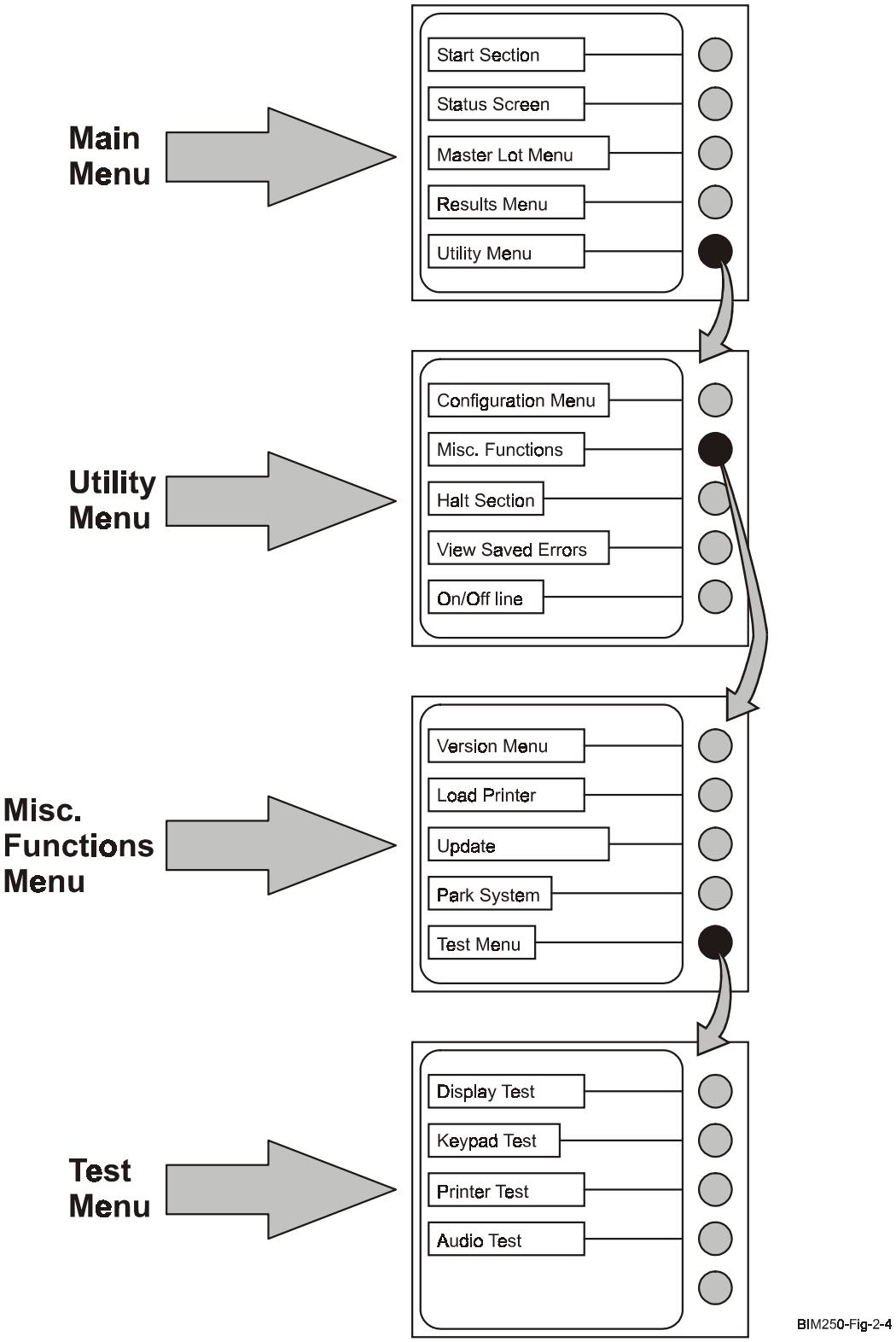


Figure 2-4 Accessing the Test Menu

Installing Paper in the Printer

Install paper in the thermal printer as follows:

1. Lift the printer door, located on top of the mini VIDAS, and remove the paper spindle.

2. Insert the spindle through the core of the paper roll, and return the loaded spindle to the vertical slots in the recessed paper housing.

3. Pull the paper engagement lever forward to the end of its slot.

4. Select **Utility Menu** from the **Main Menu**.

5. Select **Misc. Function** from the **Utility Menu**. The Miscellaneous Function Menu appears (see Figure 2-4).

6. Select **Load Printer**. The **Load paper now. . .** message appears.

7. Push the edge of the paper under the paper feed roller. A paper sensor detects the presence of the paper and activates the paper roller.

8. Place the paper engagement lever to the upper end of its slot. The paper feeds into the printer and automatically stops in a few seconds.

9. Repeat steps 6 through 8 until the edge of the paper is above the printer compartment with the door closed.

The mini VIDAS is now ready for use.

☞ **NOTE**: See the mini VIDAS Operator's Manual for additional information on configuring the instrument.

☞ **NOTE**: The shiny side of the paper should be facing upward after feeding through the printer.

External Hardware Options

The mini VIDAS is designed to work with an external printer or an optional hand-held Bar Code Reader (Wand). The installation of these external options is described in the following.

Bar Code Reader (Wand)

The mini VIDAS is designed to work with an optional hand-held Bar Code Reader Kit (P/N 30517) or a Panasonic ZE-84 Wand (Reader).

Installing the Bar Code Reader (Wand)

To install the Bar Code Reader, proceed as follows:

- Power up the mini VIDAS.
- Select **Utility Menu** from the **Main Menu** (see Figure 2-4) on the mini VIDAS.
- Select **Configuration Menu** from the **Utility Menu**. The Configuration Menu appears (see Figure 2-6).
- Press the **DOWN** arrow key to access the third page of the Configuration Menu.
- Select **Bar Code Wand**. The following selections appear:
  - ◊ **None** (the default setting)
  - ◊ **Bar Code Wand**
- Select the following:
- **Bar Code Wand** (optional Bar Code Kit)
  An **x** will appear next to the selection.
- Press the **Previous Screen** key three times to return to the Main Menu.
- Remove Power from the mini VIDAS.
- Connect the Bar Code Reader to the DIAGNOSTIC port on the rear of the mini VIDAS (see Figure 2-5).
- Power up the mini VIDAS.

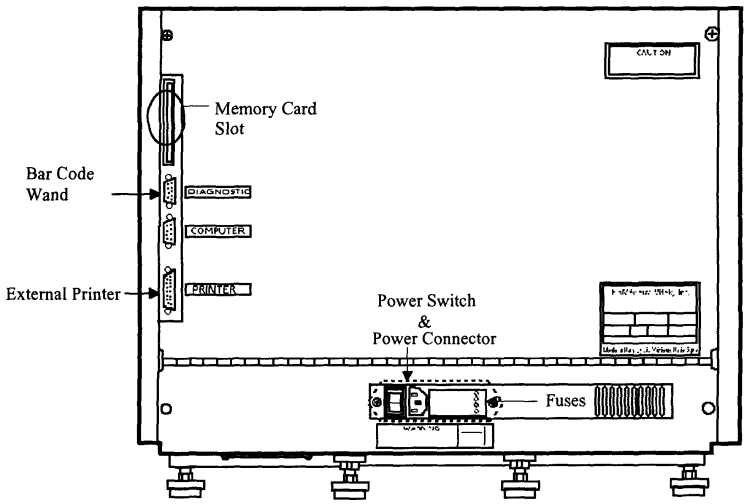


Figure 2-5 Bar Code and External Printer Connector Locations

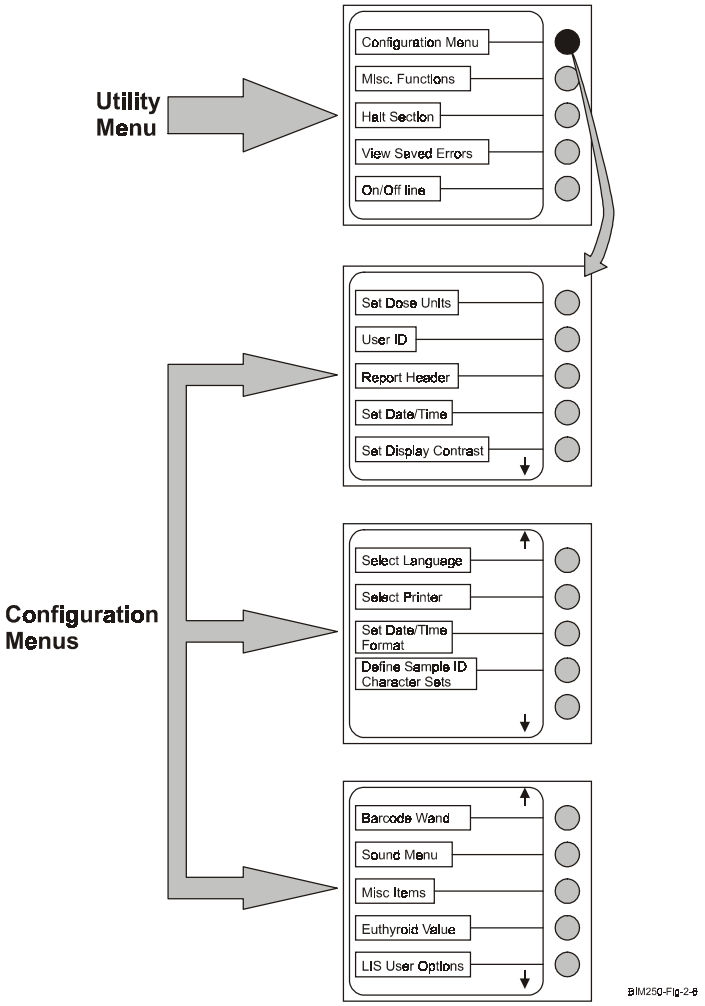


Figure 2-6 Accessing the Configuration Menus

External Printer

The mini VIDAS provides an option for printing reports on an external Personal Computer (PC) compatible printer or the internal printer. The internal thermal printer is the default. Installation of an external printer is described below.

Equipment Required

Epson compatible parallel printer.

PC compatible printer cable, having a DB 25-pin male connector on one end and a 36-pin Centronix connector on the other end.

Installing an External Printer

To install the external printer, proceed as follows:

- Connect the DB 25-pin connector to the PRINTER port on the back of the mini VIDAS (see Figure 2-5).
- Connect the 36-pin Centronix connector to the port on the printer.
- Power up the printer.
- Select **Utility Menu** from the **Main Menu** (see Figure 2-4) on the mini VIDAS.
- Select **Configuration Menu** from the **Utility Menu**. The Configuration Menu appears (see Figure 2-6).
- Press the **DOWN** arrow key to access the second page of the **Configuration Menu**.
- Select **Select Printer**. The following selections appear:
  - **Internal Printer** (The **x** indicates the current setting.)
  - **External Printer**
- Select **External Printer**.
- Press the **Previous Screen** key three times to return to the **Main Menu**.
- Select **Utility Menu** from the **Main Menu** (see Figure 2-4) on the mini VIDAS.
- Select **Misc. Functions Menu** from the **Utility Menu**. The Miscellaneous Functions Menu appears.

- Select **Test Menu** from the **Misc. Functions Menu**. The Test Menu appears.
- Select **Printer Test** from the **Test Menu**. The external printer will print the test pattern (see Figure 2-7).
- Press the **Previous Screen** key three times to return to the Main Menu.

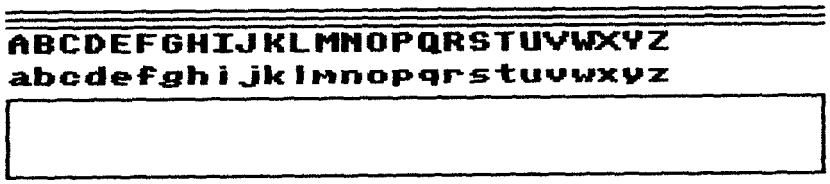


Figure 2-7 Printer Test Display

Interfacing the mini VIDAS

Any mini VIDAS instrument at software version VIC-2.1 or higher can support a literal unidirectional computer interface. This interface allows mini VIDAS results to be transmitted (i.e. uploaded) to a Laboratory Information System (LIS) or other host computer. Refer to the mini VIDAS Operator's Manual for additional information.

The interface cable (P/N 186036-x) connects to the **COMPUTER** port on the rear of the instrument. Refer to BCI Specifications of VIDAS (P/N V0460) for additional information.

To setup the interface, proceed as follows:

- Select **Utility Menu** from the **Main Menu** (see Figure 2-4) on the mini VIDAS.
- Select **Configuration Menu** from the **Utility Menu**. The Configuration Menu appears (see Figure 2-6).
- Press the **DOWN** arrow key three (3) times to access the fourth page of the Configuration Menu (See Figure 2-8).
- Select **LIS Interface Options**. The following four selections (see Figure 2-9) appear:
  - ◊ **Communications Settings**
  - ◊ **Timeouts & Limits**
  - ◊ **Data Format**
  - ◊ **Send Test Message**

☞ **NOTE**: Configuration of the above selections is dependent upon LIS Vendor specifications.

- After configuring the Interface, press the **Previous Screen** key one time to return to **LIS Interface Options** screen.
- Press the **UP** Arrow to return to the third screen of the Configuration Menu.
- Select **LIS User Options**. The following selections appear:
  - ◊ **LIS Upload Enabled**
  - ◊ **Warn About Missing IDs**

- Select the following:

  - **LIS Upload Enabled**
    An **x** will appear next to the selection.

- Press the **Previous Screen** key three times to return to the Main Menu.

Test Pattern

To send a Test Pattern, proceed as follows:

- Select **Utility Menu** from the **Main Menu** (see Figure 2-4) on the mini VIDAS.

- Select **Configuration Menu** from the **Utility Menu**. The Configuration Menu appears (see Figure 2-6).

- Press the **DOWN** arrow key three times to access the fourth page of the Configuration Menu.

- Select **LIS Interface Options**.

- Select **Send Test Message.** The Test Pattern message will be sent to the host computer.

- Press the **Previous Screen** key three times to return to the Main Menu.

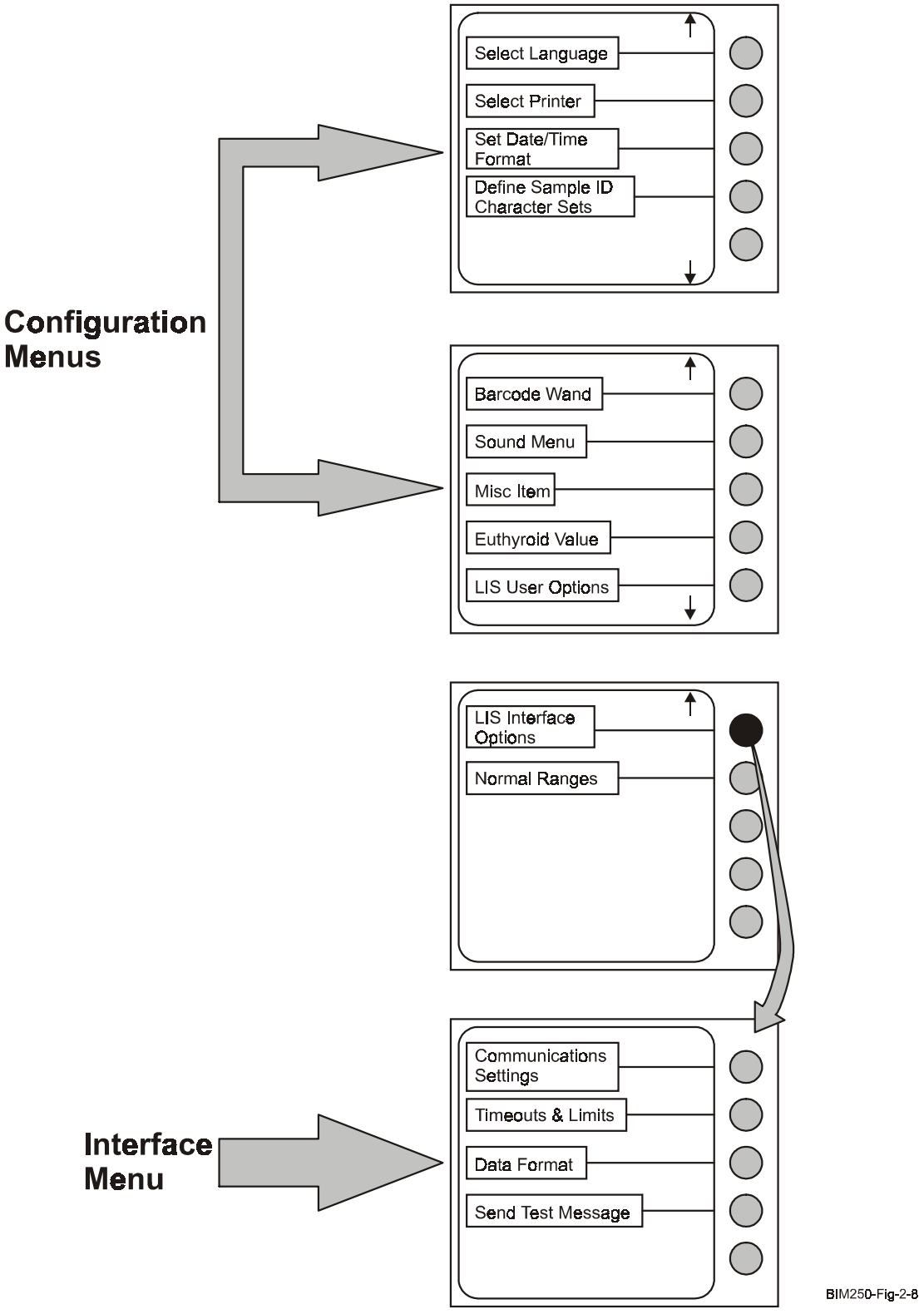


Figure 2-8 Configuration Menus and the Interface Menu

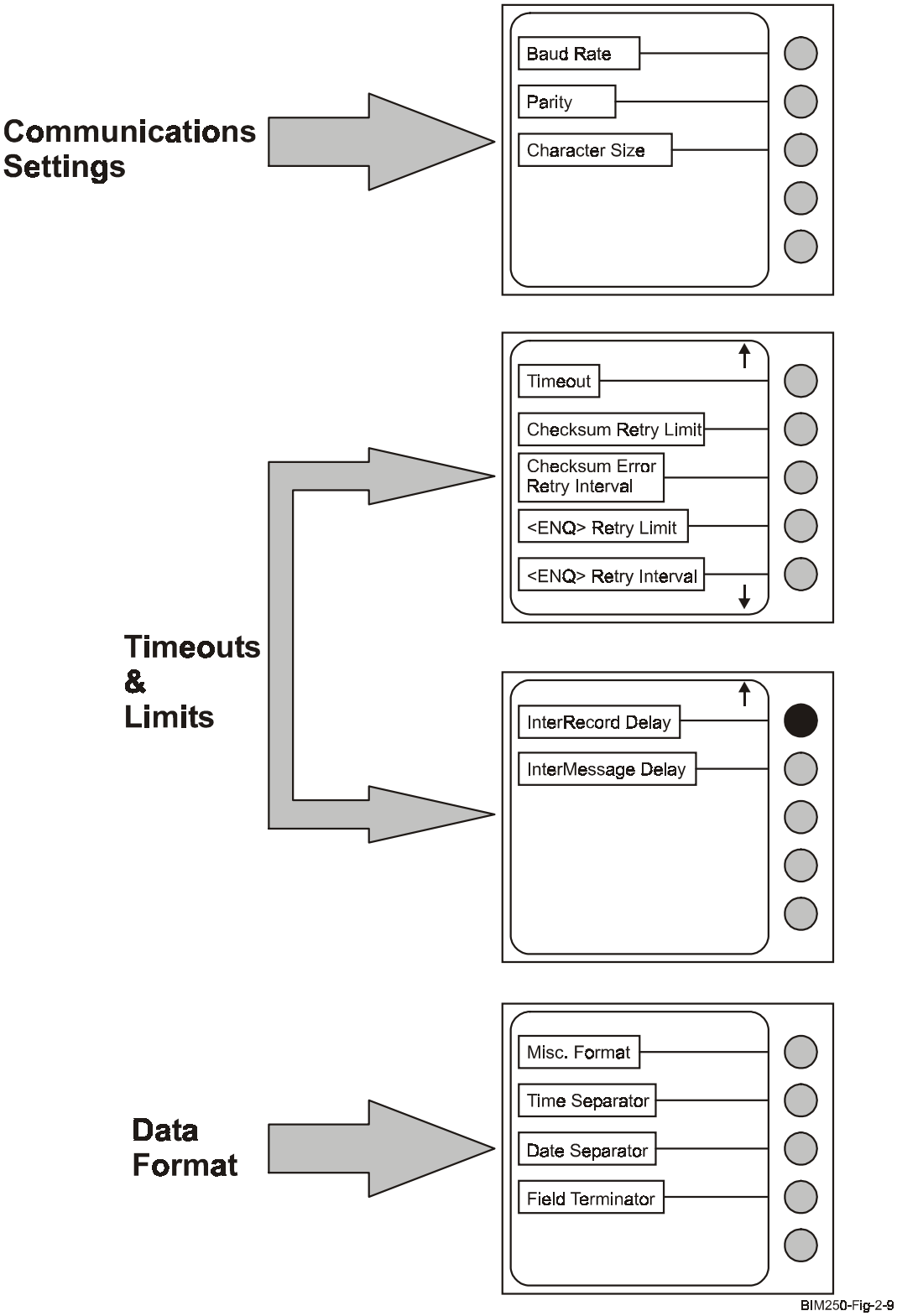


Figure 2-9 Sub-selections from the Interface Menu

Chapter Three: **System Overview**

The mini VIDAS System

The mini VIDAS provides self-contained, complete immunoassay automation. Using predispensed disposable Reagent Strips and specially coated Solid Phase Receptacles (SPRs), the mini VIDAS can pipette, mix, incubate, control, and analyze samples, without user intervention. The detection system uses Enzyme Linked Fluorescent Assay (ELFA) technology, and a fluorescence optical system to read the results of each test.

The mini VIDAS module (see Figure 3-1) is controlled by the VIDAS Internal Computer (VIC), using menu driven software to transmit the test protocols to be run based on user input. The mini VIDAS performs the assay (test) requested. Test results are transmitted to the computer to be analyzed and printed.

The mini VIDAS is a complete, stand-alone immunodiagnostic system.

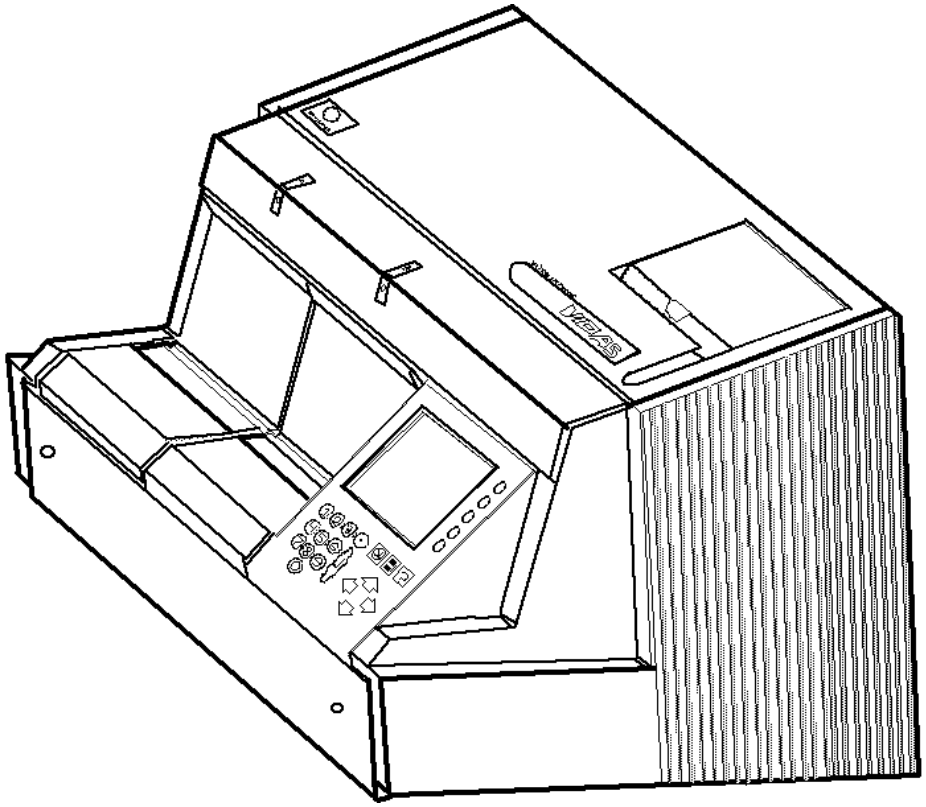


Figure 3-1 mini VIDAS

System Description

The mini VIDAS module consists of a built-in computer, display, printer and keypad. The mini VIDAS module also contains two independent sections, an optical scanner, and a controlling microprocessor. Each section (labeled A and B) can process six single or three dual Reagent Strips for a maximum capacity of twelve tests.

The mini VIDAS electronics consists of the VIDAS Internal Computer (VIC), one system controller, and two identical section controllers. Firmware on these two microprocessor based boards provide a high degree of programmability and fault tolerance to section failures in the instrument. The system controller (Scanner Board) provides the interface between the VIC and section controllers. The VIC provides complete internal computing capability and controls all aspects of mini VIDAS operations. Protocols and other information for processing assays are transmitted from the VIC to the system controller and then to the needed section controllers. The system controller also interfaces to the bar code reader and optical system, positioning the optics for data acquisition of the fluorescence signals as required.

Each section contains an incubation system, pipetting device, control motors and a microprocessor, which allow it to run independently. The microprocessor in each section translates the computer encoded test protocols into the specific actions required to process a reagent strip. If a section experiences a mechanical failure, the operator can disable it, allowing the other section to continue.

A green Light Emitting Diode (LED) above the Solid Phase Receptacle (SPR) compartment door of each Section (see Figure 3-2) indicates its operating status as follows:

OFF — The section is idle
ON — A test is in progress
FLASHING — The tests in that section are finished and the reagent strips and SPRs should be removed

The keypad and display provide the communication link for the user to VIC. The keys on the keypad are almost completely flat, and when depressed produce a “click” that can be heard and felt. The display is a Liquid Crystal type, providing all communications from the internal computer.

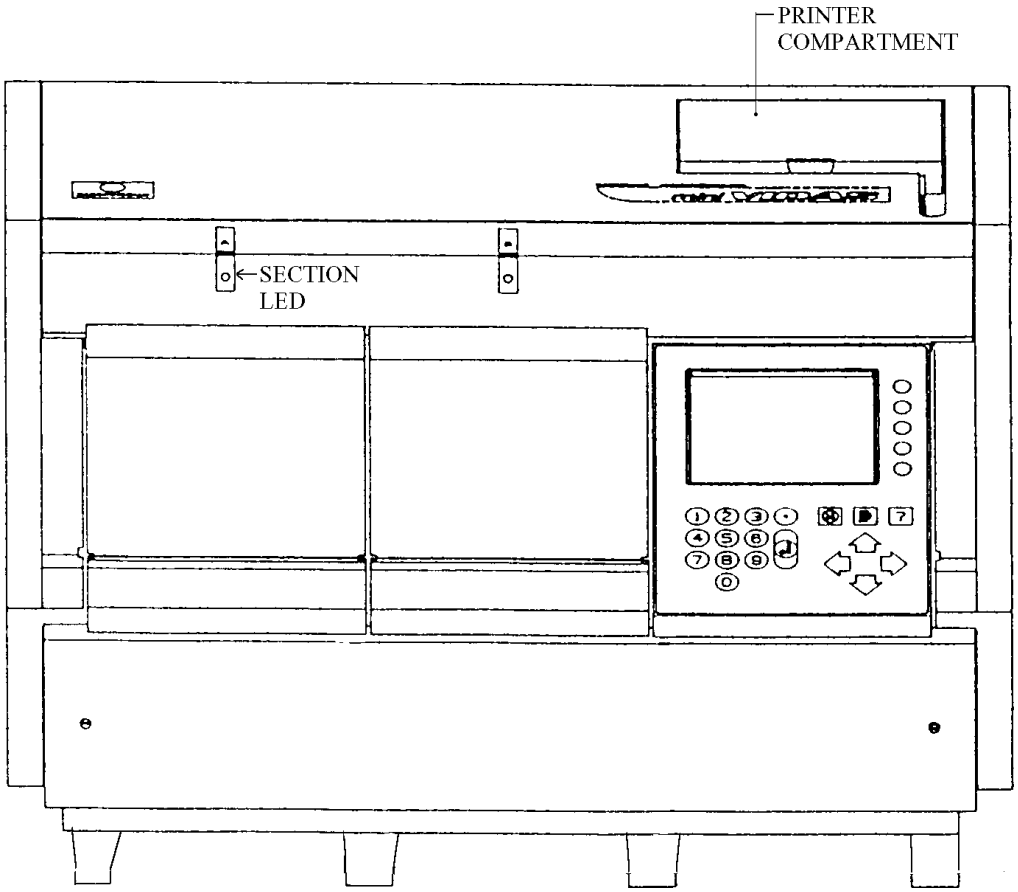


Figure 3-2 mini VIDAS Front View

Reagents/Reagent Strips

Reagents for performing assays on the mini VIDAS are prepackaged for 15, 30, or 60 tests per kit. The kit components include pre-dispensed reagent strips and solid phase receptacles (SPR), along with controls and reference materials needed. A single bar coded reagent strip (Figure 3-3) and related SPR contain all the reagents required for on-line processing of one test. The bar code label identifies assay type, lot number and expiration date. A color-coded dot, with three-letter assay code, is used to match the reagent strip to its related SPR. Each reagent strip contains one sample well, eight reagent wells, and one optical cuvette. The test specimen is placed in the sample well of the strip and the strip is placed in the instrument. Reagents are protected in the strip by a foil seal that can be punctured by the instrument as needed. When an assay is completed, all liquid wastes are contained in the reagent strip for safe and convenient disposal.

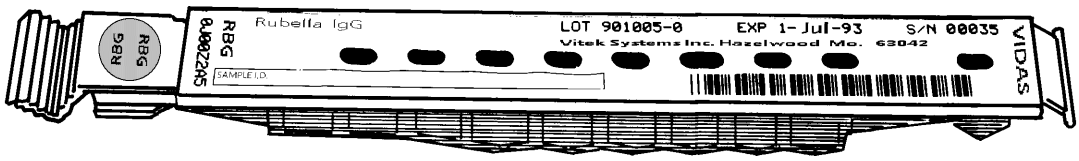


Figure 3-3 Single Reagent Strip

Some tests require a dual reagent strip (Figure 3-4), consisting of a reference strip and a test strip. The reference strip detects nonspecific fluorescence due to the variability of the sample matrix; while the test strip contains an analyte specific reagent not included in the reference strip. Measurements from both strips are used to determine test result.

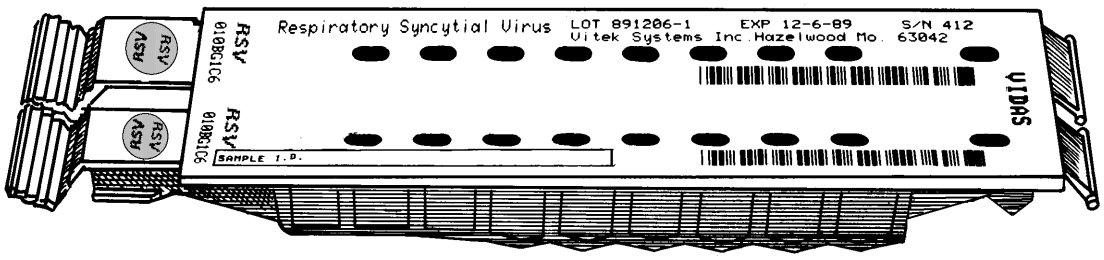


Figure 3-4 Dual Reagent Strip

The SPR

The Solid Phase Receptacle, or SPR (pronounced “spur”), is a pipette tip shaped device made from polypropylene or polystyrene material. The inside surface is coated at the time of manufacture with antigen, antibody, or other treatments that allow it to capture soluble proteins, viruses, bacteria, and whole cells. The SPR (Figure 3-5) has a beveled edge for piercing the foil seal on the reagent strip. The instrument automatically cycles reagents into and out of the SPR at various points in an assay to provide increased surface contact, generate extended fluid mixing, or to transfer fluids between wells. Each SPR has a corresponding VIDAS Reagent Strip included in the test kit; both are coded with matching color dots and assay code. It is critical that SPRs be paired only with strips that have matching dots. Otherwise, the SPR will be incompatible with the reagents in the strip and the test results will be invalid.

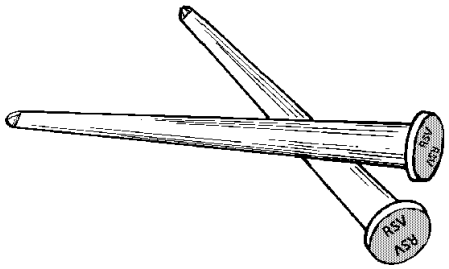


Figure 3-5 Solid Phase Receptacle (SPR)

Operator Interface

All operator interface to the mini VIDAS is provided through menu-driven software residing in the VIDAS Internal Computer (VIC). The operator accesses the software through the Keypad Screen on the front of the mini VIDAS.

The operator places a specimen in the sample well of each reagent strip and then inserts the strip(s) into the instrument. SPRs are loaded into the SPR compartment above each strip. Assays using the same protocol can be placed in the same section of the instrument, as data handling and reports will treat the samples individually upon completion.

When an operator wants to process one or more specimens, the first task is to select **Start a Section** from the **Main Menu.** The screen displays a choice of available options **Section A**, **Section B**, or **All Sections**. The operator then selects the desired **Section** or **All Sections** and indicates their identification number. The mini VIDAS will perform the requested tests unattended. This is also known as a **LOAD and GO Run**, and does not require sample IDs, standards or controls (standards and controls entered previously).

A built-in Bar Code Scanner verifies correct placement of reagent strips in each section. If the wrong type reagent strips have been placed in a section, processing of that section will be halted and the operator warned. If this QC check is successful, the processing protocol is carried out under control of the microprocessors in the mini VIDAS. Upon completion of the test, results are transmitted to the VIC for data analysis and a report is printed. Should an error occur during the test, a warning is displayed on the screen and printed out on the test report.

See the mini VIDAS Operator's Manual for additional information on performing tests.

Protocols

A protocol is the set of instructions used by the mini VIDAS to run an assay. It defines the sequence of fluid manipulations and fluorescence readings, along with mechanical functions of the section during an assay.

Protocols for the assays used on the system are automatically stored in the computer memory. As new assays and protocols are developed, the customer will receive a new memory card, or a set of Bar Code Assay & Protocol (BAP) Cards. Updates to protocols are loaded into the computer. When the mini VIDAS logs onto the VIC, it sends a command to download the protocol set, as needed. The transmitted protocol set is stored in memory on the Scanner Board.

When tests are run, the required protocol is sent from the Scanner microprocessor to the microprocessor in the section in which the tests are being run. In each of the two sections in the mini VIDAS the reagent tray and SPR block interact in response to the protocol of the assay being run. This means that all six positions within a section will follow the same protocol. Therefore, all tests run in a particular section must use the same protocol. Some mini VIDAS assays use the same protocols and may occupy the same section on the instrument. The mini VIDAS will automatically alert the user that assays are not compatible.

Future updates of assays and protocols will be accomplished using flash memory cards.

See the mini VIDAS Operator's Manual for additional information.

Test Description

Antigen Detection

A detailed description of an Antigen Detection Assay appears in Figure 3-6.

- A SPR coated with capture antibody is used.
- The sample is pipetted in and out of the SPR, binding the target organism to the inside the SPR.
- A well containing a wash solution moves under the SPR. The wash is pipetted, removing any unbound sample.
- The next reagent contains an enzyme-conjugated antibody for the target organism. The antibody binds to the target organism forming a “sandwich.”
- Another wash cycle removes any unbound tagged antibody.
- Substrate is pipetted and the sample breaks down into subcomponents that fluoresce.
- The sample is then pipetted into an optical cuvette, where a photodiode reads the fluorescence.
- The result is calculated by an analysis routine.

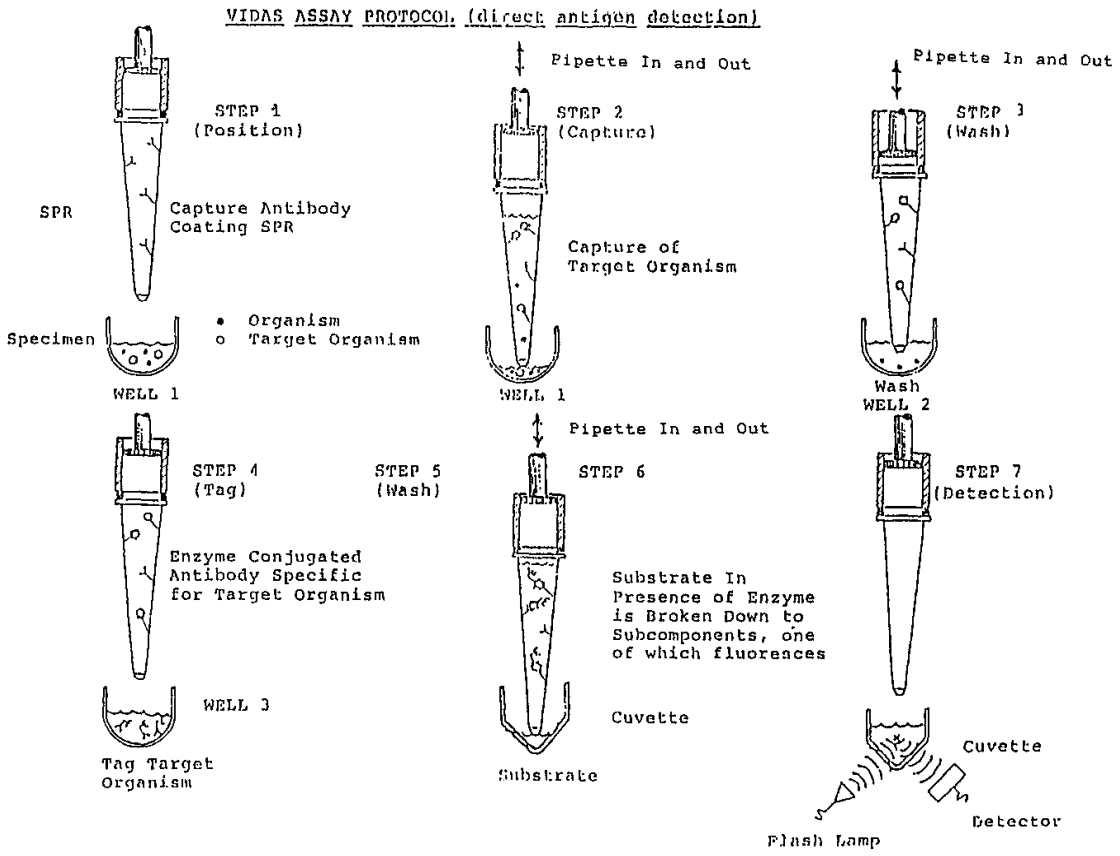


Figure 3-6 Antigen Detection

Antibody Detection

The only difference in an antibody detection assay is that the SPR is coated with a capture antigen. The result is calculated by an analysis routine.

Analysis Methods

The mini VIDAS uses several different methods to calculate results. Three basic categories of analysis methods are:

Test to Standard	A comparison of the Relative Fluorescence Value (RFV) of the test sample to that of a standard. This method is used in Single Reagent Strip qualitative, and most semi-quantitative, assays.
Test to Reference	A comparison of the RFV of the test sample to that of a reference blank. This method is used in Dual Reagent Strip qualitative assays.
Curve Fitting Equations	The RFV of a test sample is mathematically placed on a Calibration Curve. This method is used for all quantitative, and some semi-quantitative, assays.

The following terms are used in the discussion of analysis methods:

Background	The reading of the fluorescence of the substrate in the optical cuvette. This reading is taken during the bar code processing phase of a run.
RFV	**R**elative **F**luorescence **V**alue. This is the fluorescence reading of a reagent strip minus the background.
Reference	The second strip of a dual reagent strip. This strip lacks the reaction ingredient that forms a fluorescent product.
Standard	Qualitative and semi-quantitative assays. A solution of known RFV to which the RFV of a test sample is compared. Quantitative assay. A solution with a known concentration of analyte that is used to calibrate a standard curve.
Test Value	The quantity calculated by the analysis method in qualitative and semi-quantitative assays. The test value is compared to a set of thresholds in the software to generate the assay result.
Threshold	Experimentally determined Test Values for qualitative and semi-quantitative assays that translate the Test Value into a significant Result.
Results	**Positive**. A significant level of analyte is present in the test sample. **Negative**. A significant level of analyte is not present in the test sample. **Equivocal**. The result falls in a zone between Positive and Negative. The test value obtained is close to both Positive and Negative results. The test should be rerun.

Single Reagent Strip

Single Reagent Strip assays are calibrated using a standard supplied with the assay kit. The standard should be run the first time the assay kit lot is used. The software maintains the standard result for 14 days, at which time it automatically expires, requiring the standard be rerun.

Two analysis methods are for Single Reagent Strips qualitative assays: The **P/S** method and the **P-S** method. The **P** stands for the RFV of the test sample and the **S** stands for the RFV of a standard.

In the **P/S** method, the ratio of the test sample RFV to the standard RFV is calculated, giving the Test Value.

Example: RFV (sample) = 2158 Test Value = 2158 ÷ 2177 = 0.99
RFV (standard) = 2177

In the **P-S** method, the test value is calculated from the difference between the test sample RFV and the standard RFV.

Example: RFV (sample) = 1774
RFV (standard) =1689
Test Value = 1774 - 1689 = 85

In both the **P/S** and **P-S** methods, the Test Value is compared to pre-established high and low thresholds stored in the computer for the assay type. The assay result is determined as follows:

If the Test Value is	The Result is
≥ High threshold	Positive
< High and ≥ Low threshold	Equivocal
< Low threshold	Negative

Dual Reagent Strip — Qualitative Assays

Dual Reagent Strips assays do not require separate calibration standards. The reference strip serves the same purpose. For qualitative assays, two methods of analysis are used: The **P/N** method and the **P-N** method. The **P** stands for the RFV of the test sample, and the **N** stands for the RFV of a reference.

In the **P/N** method, the ratio of the test sample RFV to the reference RFV is calculated, giving the Test Value.

Example: RFV (sample) = 2158 Test Value = 2158 ÷ 2177 = 0.99
RFV (reference) = 2177

In the **P-N** method, the test value is calculated from the difference between the test sample RFV and the reference RFV.

Example: RFV (sample) = 1774
RFV (reference) =1689
Test Value = 1774 - 1689 = 85

In both the **P/N** and **P-N** methods, the Test Value is compared to pre-established high and low thresholds stored in the computer for the assay type. The assay result is determined as follows:

If the Test Value is	The Result is
≥ High threshold	Positive
< High and ≥ Low threshold	Equivocal
< Low threshold	Negative

Quantitative Assays

Quantitative mini VIDAS assays use a Calibration Curve to determine analyte concentrations in test samples. The basic steps required to run quantitative assays are:

- Enter the Master Lot Data for the Calibration Curve into the system. A Master Lot Data card is supplied with the assay kit and is applicable for all tests run using that particular assay kit lot.
- Run the calibration standards supplied with the assay kit to adjust the Calibration Curve to the mini VIDAS.
- Run the test samples.

NOTE: Although standards can be run after the test samples have been completed, it is recommended that they be run either before or with test samples. Also if there are two standards, both must be run at the same time.

Chapter Four: **Parts of the System**

The mini VIDAS consists of the following parts:

- Temperature Control
- Reagent Handling System
- Optics
- Auto Calibration
- Scanner Board
- Incubator Board
- Bay Interface Board
- Motors and Sensors
- Internal Computer
- Power Supply
- Keypad and Display Screen
- Internal Printer

Figure 4-1 shows a block diagram of the instrument.

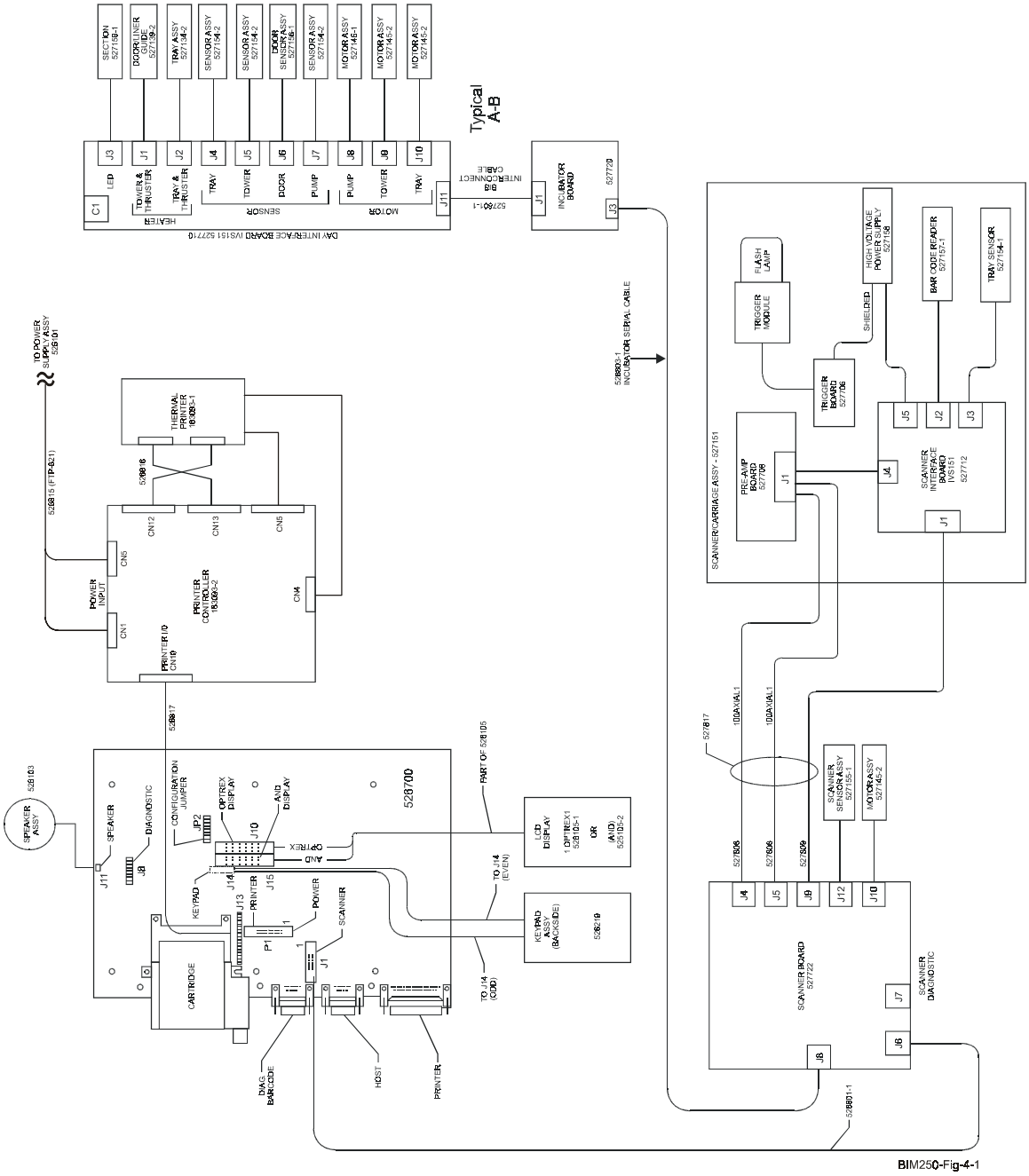


Figure 4-1 mini VIDAS Block Diagram

Temperature Control System

A constant temperature is maintained in the areas where the assay reactions take place. Each group of six Solid Phase Receptacles (SPRs) is enclosed within a thermally isolated heating block. The movable trays that hold the reagent strips are also regulated by temperature controls.

There are two separate temperature controllers in the mini VIDAS for each Section. Each Section controller regulates the core temperature of the SPR Block and Tray. The controllers operate with complete independence from each other. The performance of each temperature circuit is independently controlled by an internal microprocessor on the Incubator Board. An error message will display if the temperature in either system deviates from the expected range. An additional controller regulates the Power Supply enclosure temperature to help regulate internal air temperature in the instrument.

Each temperature controller contains a 0.1% on board 37°C reference. The temperature sensing devices, contained within the SPR Block and Tray, are ±0.2 °C accuracy thermistors. Low voltage AC current is used to safely power the heaters.

The SPR Block is heated by a surface-mounted heating element. The thermistor, located in the block, senses its temperature and connects to a proportional controller, which adjusts the low voltage AC current to the heating element, thus maintaining a constant Block temperature of 37°C ± 1.5°C and should not exceed ±0.5°C from the average of all Sections.

The temperature of each movable Reagent Strip Tray is maintained by an identical heating and control system at 37°C ± 1.7°C and should not exceed ±0.7°C from the average of all Sections.

Reagent Handling System

Reagent handling within the mini VIDAS is supplied by six channel pipettor modules (two each) that perform all fluid transfer, dilution, and wash operations using the Solid Phase Receptacles (SPRs). The pipettors can accommodate liquid volumes in the 10µl to 316.5µl range. One six-channel pipettor module (Pump Assembly) is located in the Tower Assembly of each Section. The six separate pipettors, in each Pump Assembly operate in mechanical unison, but have no fluidic inter-connection. The entire Pump Assembly moves vertically in the Tower Assembly, allowing the SPRs to pierce the foil seal and access wells in the Reagent Strips, which move horizontally under the module.

A cross section of one pipettor in the pump assembly is shown in Figure 4-2. The SPR (1) is connected to the pipettor by a resilient grommet seal (2). Fluids are moved in and out of each SPR channel by an air displacement piston. This piston (3) is sealed using a low-friction rolling diaphragm (4) that maintains a constant effective piston area throughout its operating range. The actuating system is designed to provide a linear translation of actuator arm motion to piston movement and thus fluid displacement.

Pipetting volume and the speed at which fluids move into or out of the SPR are microprocessor controlled and programmable through protocol commands, downloaded by the software. A linear stepper motor (5) with an integral lead screw produces a precise linear motion that translates through the lever arm (6), the pivot point (7), and the pressure plate (8) to the top of each piston in the Pump Assembly.

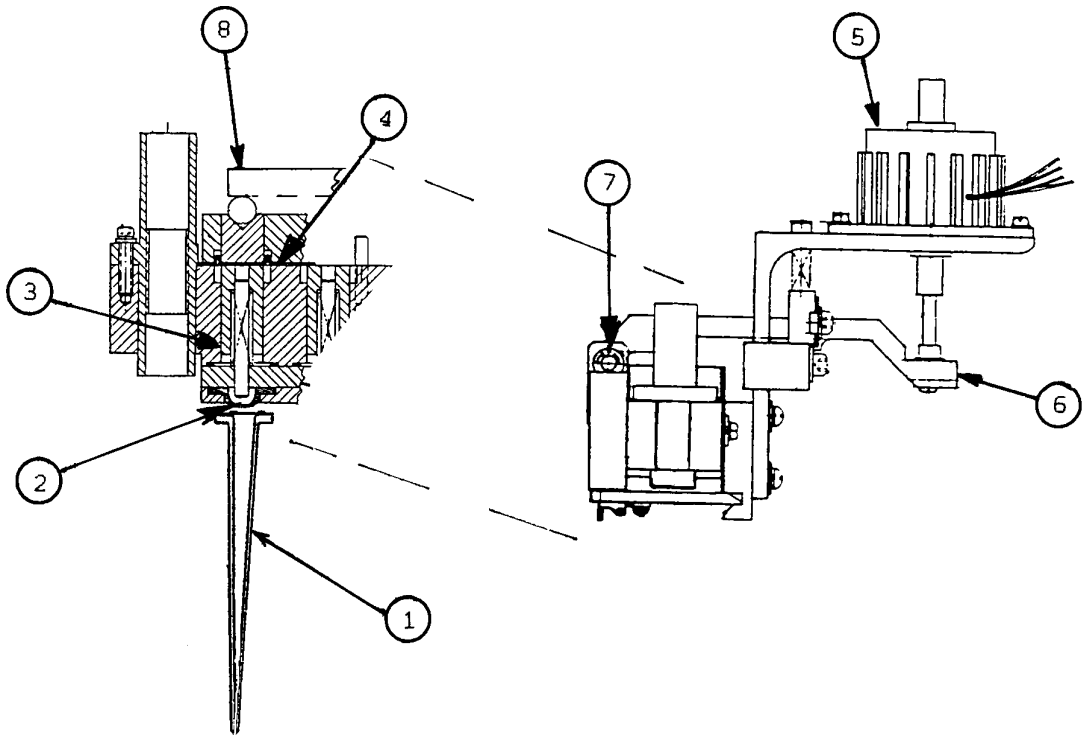


Figure 4-2 Reagent Handling System

Precision manufactured parts in the pipettor control the volume accuracy of the fluid displacement. The pipettors do not require field calibration. But the accuracy of the pipettors can be checked by using bioMérieux controls or the QCT Assay. The SPR grommet seals should be replaced every twelve months (Preventive Maintenance), if they become contaminated, or are damaged.

When running an Assay, optical sensors and the microprocessor on the Incubator Board monitor the linear motion in the pipetting system. If a deviation in the extended linear displacement occurs, the Assay halts automatically and the computer issues an error message.

Optics

The mini VIDAS optical system measures the concentration of fluorescence from the reaction product developed during an Assay with a single channel fluorometer. The optical system uses a dual-beam excitation system to compensate for variations in lamp output. The optical system moves across the instrument to read the desired test position. The Scanner/Carriage assembly moves the optical system to each sample.

WARNING! **HIGH VOLTAGES** and **ULTRAVIOLET LIGHT** are present on the Scanner/Carriage Assembly. High voltage poses the risk of shock or electrocution. Ultraviolet light can damage the eyes.

For a diagram of the fluorometer, see Figure 4-3.

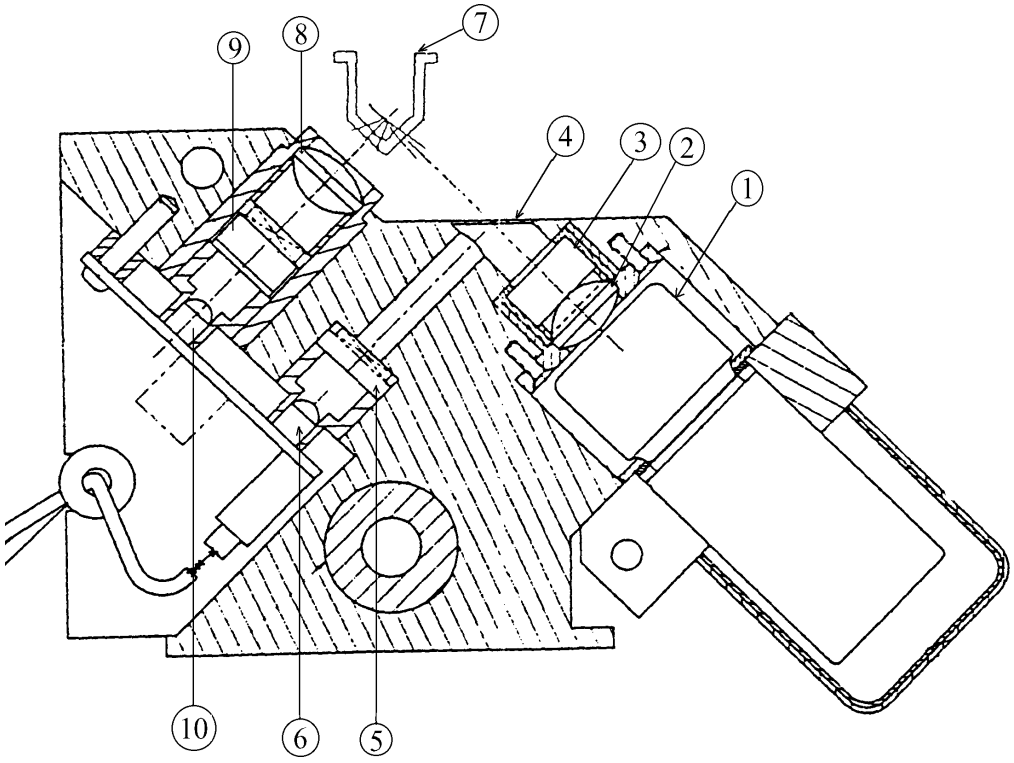


Figure 4-3 Fluorometer Optics

The excitation optics consist of a xenon flash lamp source (1) filtered by a 370 nm narrow band optical filter (3). Multiple flashes, triggered under computer control, are projected through an aspheric lens (2) as a collimated image of the arc from the flash lamp onto the optical cuvette (7). The reaction product then produces a fluorescence signal proportional to its concentration.

The detection optics measure the fluorescence signal using a lens (8) that focuses on the center of the cuvette, at a 90-degree angle from the excitation source. The lens projects an image of the center of the cuvette through a 450 nm narrow band filter (9) onto a high sensitivity PIN photodiode (10).

A fraction of the excitation beam is reflected by a beam-splitter (4) through a UV pass filter (5) onto a reference photodiode (6), producing a signal proportional to the intensity of the excitation beam. Optical readings are measured by the system as a ratio of the detected light to the intensity of the flashlamp, allowing the electronics to compensate for changes in the intensity of the flashlamp.

Each flash of the excitation lamp produces output pulses from the signal and reference photodiodes. High linearity peak detectors hold the maximum amplitude of each pulse. The outputs of the peak detectors are applied to a 12-bit analog-to-digital (A/D) converter producing an output proportional to the ratio of the emission intensity to the excitation intensity. Each reading cycle consists of a set number of flashes by the lamp. High and low readings are discarded to filter noise components and the remaining readings are averaged by an internal microprocessor, on the Scanner Board, to provide the final value in Relative Fluorescence Units (RFU).

Internal self-diagnostics of the optics include computations that monitor the CVs of the readings. The computer also periodically takes readings in air and issues a message if the air readings fall out of expected bounds. All mini VIDAS have a built-in solid reference standard used to check and compensate for small changes due to optics calibration drift between calibrations (Auto Calibration).

The instrument is calibrated using a standard calibration solution, in a VIDAS Calibration Strip prepared by bioMérieux. These calibration strips are checked by QC/QA, and values are assigned to the strips [approximately a 3,200 RFU reading with an approximately 7,000 nm solution of 4-methylumbelliferone (4-MU) in a buffer]. Instrument calibration should be checked every twelve months by a factory trained Field Service Representative.

The fluorometer, located on the Scanner/Carriage Assembly, is shown in block diagram in Figure 4-4. The flash lamp circuit consists of a high voltage power supply (600 VDC) and related trigger control circuits. The signal and reference photodiodes are located on the Pre-Amp Board. Coaxial cables routed through a flexible E-chain duct assembly, connect the signal and reference photodiodes to the Scanner Board.

A Bar Code Reader that scans the bar code on the reagent strip label, and a tray edge sensor for locating the tray are also found on the Scanner/Carriage Assembly.

The Scanner Interface Board provides interfacing between the Scanner/Carriage Assembly and the Scanner Board.

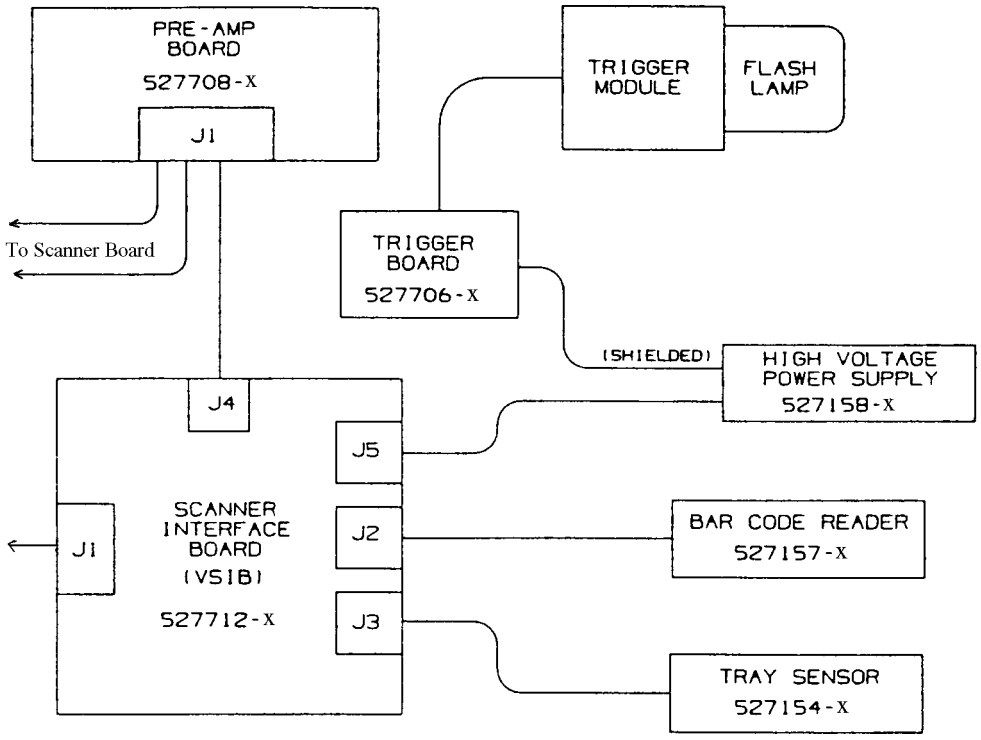


Figure 4-4 Block Diagram of the Fluorometer

Auto Calibration

The mini VIDAS incorporates a material imbedded in an optically transparent polymer as a fluorescence optical reference. This reference allows the Scanner Board to monitor the condition of the entire optical system for changes that could result in optical drift. The long life-reference material, placed in a standard VIDAS cuvette, is mounted internally and placed between Sections A and B. The optical system periodically measures the reference, and the results are closely monitored by the Scanner Board to insure there is minimal optical drift between calibrations.

After calibration with a VIDAS Calibration Strip, the instrument is instructed to read the Solid Reference Standard and the value is stored in non-volatile RAM on the Scanner Board. This value serves as a reference point for calibration checks. When the instrument verifies its calibration, internal digital circuitry automatically adjusts the internal reference signal to this stored value.

When the mini VIDAS is powered up (booted) it will check for a stored value for the Solid Reference Standard and for its bracket. If the instrument finds a value but no bracket or finds a bracket and no value, it will generate an error message and not run any assays. The instrument must find both the stored value and the solid standard bracket before it will operate with autocalibration capabilities. When an instrument is powered up, the AUTOCAL function will not check or change calibration until it successfully logs onto the host computer and receives a VIDINFO message from the host computer.

When an instrument with autocalibration installed is powered up, it will read the internal Solid Reference Standard and compare that value to the value stored in memory. If the difference in the two values is in tolerance, the instrument continues to operate normally and will check calibration every 12 hours after that. Should the instrument be busy when the next scheduled calibration check occurs, then it switches to an hourly schedule until the check can be performed. After checking calibration, the instrument will go back to a 12-hour schedule. If an instrument is kept so busy that it is never able to perform a calibration check, it will generate an error message to warn the user that calibration has not been checked recently.

The mini VIDAS performs a calibration check by taking three readings of the Solid Reference Standard and averaging the results. This average value is then compared to the stored value. The instrument will re-calibrate if the difference is more than 0.6% (19 RFUs @ 3200) of the stored value. The Scanner board will adjust itself and take three more readings. The average of these readings is again compared to the stored value, but must now be within 0.4% (13 RFUs @ 3200). The Scanner Board will continue to adjust itself until it meets the 0.4% limit. The instrument will generate an error and not run assays if it fails to calibrate successfully.

Autocalibration operation and limits can be summarized as follows:

- Calibration Requirements / Accuracy:
  - Solid Reference must be 2900 RFUs to 3600 RFUs.
  - Average 3 readings to determine value of Solid each time calibration is checked or adjusted.
  - Recalibrate if Solid value is more than ±0.6% (±19 RFUs @ 3200) different than stored value.
  - Recalibrate to within ±0.4% (±13 RFUs @3200).
- Calibration Timing / Frequency:
  - Turn on autocalibration only if a valid **VIDINFO** message is received from the host computer.
  - Check calibration only when instrument is idle.
  - Check calibration every 12 hours.
  - If prevented from checking calibration as scheduled at 12 hours, go to a one-hour schedule until able to check calibration.
- Error / Warning Reporting:
  - Generate a warning (fault code: 160) if calibration changes by more than 3% (96 RFUs @ 3200) from one check to the next.
  - Generate a warning (162) if calibration has not been checked in the last five days.
  - Generate an error if either the Solid Reference bracket (158) or stored calibration data (157) can't be found and the other is present.
  - Generate an error (159) if the Solid Reference bracket was found on power up, but can no longer be found.
  - Generate a warning (161) if the digital potentiometers are within 9.2% of the end of their range.
  - Generate a second error (161) if the digital potentiometers are within 2.3% of the end of their range and inhibit the running of assays.

Scanner Board

The Scanner Board, located on the back cover of mini VIDAS, is a single board computer built around the 8032 microprocessor. The Scanner Board has 64K of both read-write (RAM) and read-only (ROM) memory and enhanced input/output capabilities, including two full-duplex serial input/output channels. There is also a 12-bit analog-to-digital (A/D) converter for the ultraviolet (fluorescence) data readings, a peripheral interface adapter (PIA), circuitry for extended range optics, and auto calibration. A block diagram of the Scanner Board is shown in Figure 4-5.

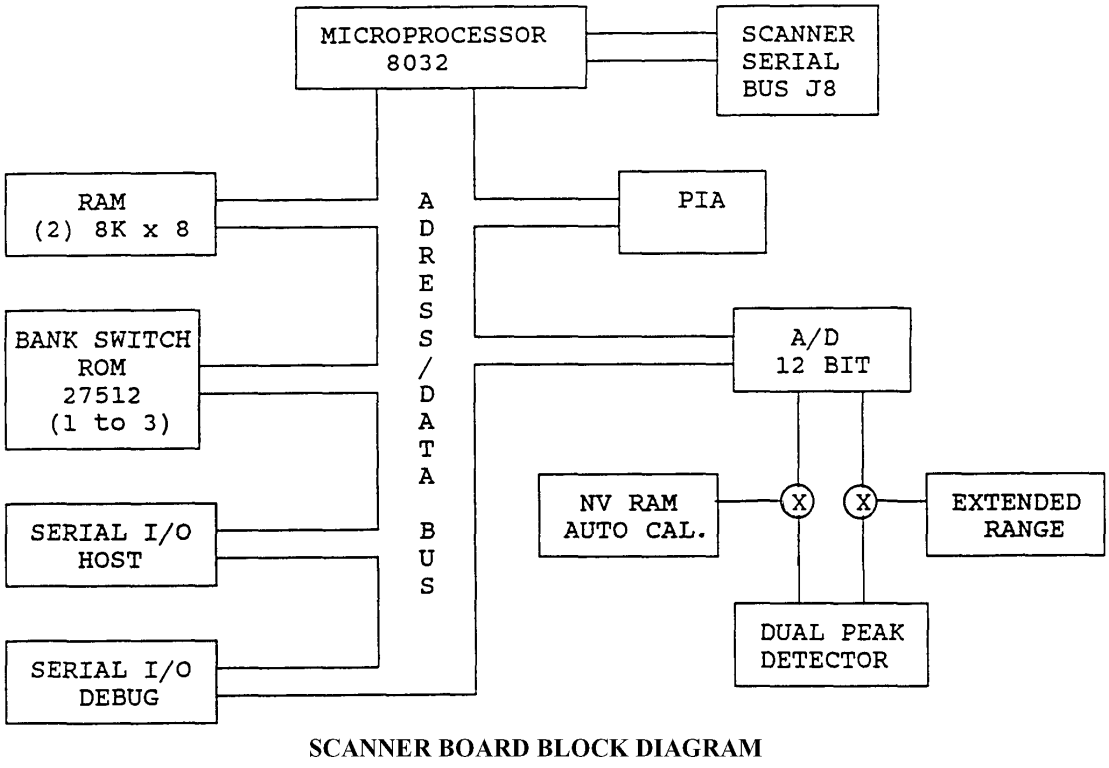


Figure 4-5 Scanner Board Block Diagram

Firmware on the Scanner Board provides support for:

- Assay Scheduling
- Auto Calibration
- Bar Code Reading
- Communication with Incubator Boards
- Extended Range Optics
- Startup and self-test diagnostics
- Temperature calculation, monitoring and reporting

The 8032 microprocessor's built-in serial port connects to the serial ports of the two Incubator Boards on a common line (J8), enabling the Scanner to communicate with and control the incubators. One of the 82050 serial ports (J6) is the COMPUTER I/O and connects to the host computer (VIC) enabling it to control the mini VIDAS through the Scanner computer. The second serial port (J7) is the DIAGNOSTICS I/O and is used for hardware diagnostic output from the Scanner computer to a terminal.

The Scanner computer also operates the fluorometer and bar code reader, on the Scanner/Carriage Assembly. The Scanner computer controls the Scanner/Carriage Assembly through the 8255 peripheral interface adapter (PIA), which controls a motor to move the carriage assembly to the appropriate Section (Incubator) tray whenever a bar code or fluorescence reading is taken. The Scanner computer then operates the bar code reader or A/D converter to collect and transmit the data to the host computer. Refer to Appendix D for additional board information.

The functions of the Scanner Board can be summarized as follows:

- Controls Scanner/Carriage Assembly
- Controls Bar Code Reader and Tray Edge Sensor
- Controls all Incubator Sections (Boards)
- Contains Peak Detector & Amplifier for Fluorescence Readings of Scanhead
- Processes / converts fluorescence readings to a digital value transmitted to Computer
- Startup and Hardware Self-Tests
- Serial Port for Terminal DIAGNOSTICS
- Serial Port for COMPUTER (VIC)

Incubator Board

The Incubator Board is an 8032 microprocessor based slave controller. It controls one section of the instrument based on instructions received from the Scanner Board through the serial bus (J3). Two Incubator Boards, located inside the back cover of the mini VIDAS, connect to the serial bus. Each board has a serial address defined by jumpers on the board.

A block diagram of the Incubator Board is shown in Figure 4-6. Firmware on the Incubator Board supports quantitative and qualitative assays. The Incubator Board monitors the state of various optical switches in its Section and visually displays their status through Light Emitting Diodes (LEDs) located on the board. The board also controls the Pump (Pipettor), Tray, and Tower motors. Two independent temperature controllers, located on the board, are monitored by the Incubator computer through a 4-channel analog to digital (A/D) converter.

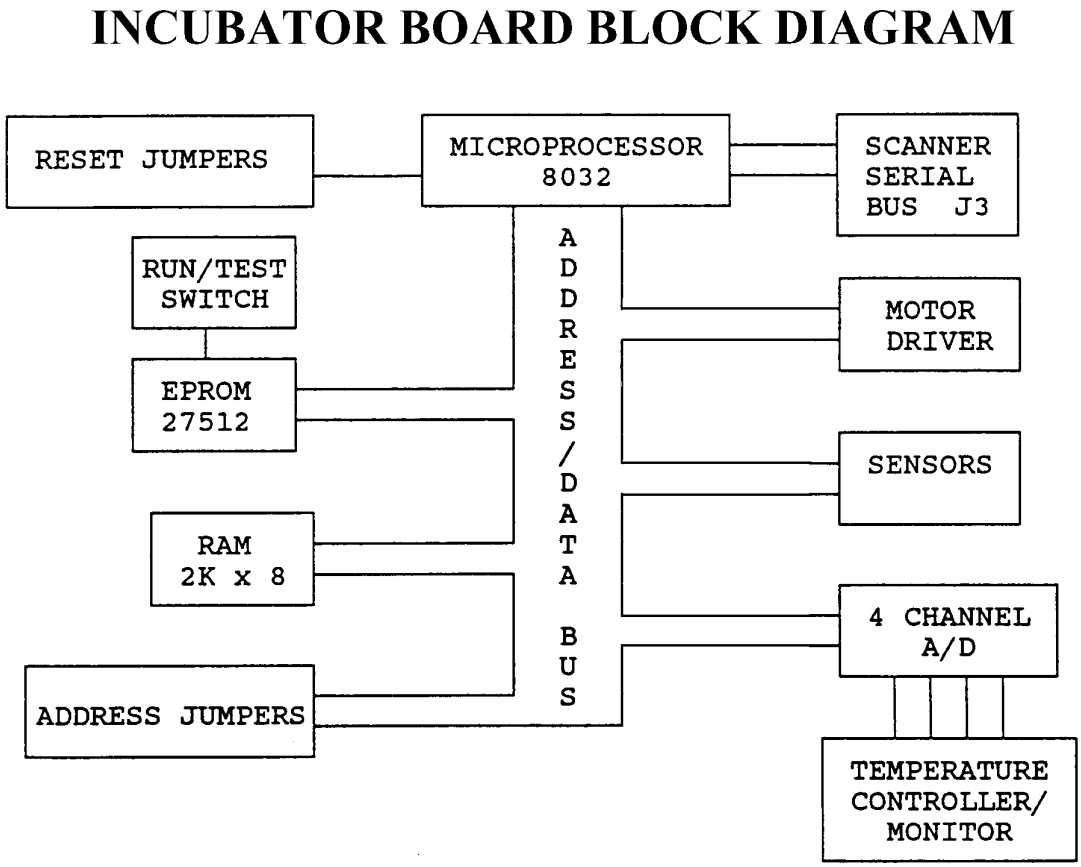


Figure 4-6 Incubator Block Diagram

Address and Reset jumper configuration for an Incubator Board configured for Section A is shown below. Refer to Appendix D for additional board and jumper configuration information.

ADDRESS JUMPER	RESET JUMPER
JP6 1-2	JP5 OUT
JP7 1-2	JP4 OUT
JP8 1-2	JP3 OUT
JP9 2-3	JP1 IN

The Incubator Board can be summarized as follows:

- Two boards per mini VIDAS
- Controls pipette, tower, and tray motion
- Controls, monitors, and reports SPR and tray temperatures
- Delegates protocol information
- Reports status and error information to the Scanner Board

Bay Interface Board

A Bay Interface Board is located on each tower assembly. The Bay Interface Board can be summarized as follows:

- Two boards per mini VIDAS

- Provide interfacing between the Incubator Board and the heaters/thermistors, motors, sensors, and front panel LED in the section it controls.

Motors and Sensors

Stepper motors are used to drive the Pump, Tower, Tray, and Scanner/Carriage Assemblies. The Tower, Tray, and the Scanner/Carriage Assemblies use the same type of motor. Microprocessors on the Incubator and Scanner Boards know the location of these assemblies by counting the steps required to move their controlling motor from its "**home**" position, which is determined by an optical sensor. The Pump, Tower, and Tray motors in each Section are controlled by that Section's Incubator Board while the Scanner/Carriage Assembly is under control of the Scanner Board.

Reflective sensors are used to provide a "**home**" reference point in each Section. The operation of this type of sensor can be affected if the reflective surface is dirty or marred. Voltage measured across the green and white wires (collector) of the sensor should be approximately 0.8 VDC or less with a reflective surface in front of the sensor.

The "**home**" position for the Scanner/Carriage assembly is determined by a flag mounted on the Scanner assembly interrupting an optical sensor.

VIDAS Internal Computer

The VIDAS Internal Computer (VIC) Board with memory is designed to provide complete internal computing capability for stand-alone mini VIDAS instruments. The VIC Board, located on the right-hand end panel, is built around the 68302 microprocessor, and provides read/write (RAM), read-only (ROM), and Flash (ROM) memory. The VIC Board also has a PCMCIA compatible memory cartridge slot and a real time clock with battery backup. A block diagram of the VIC Board is shown in Figure 4-7.

The computer's built-in parallel ports support both the OPTREX and the AND type of Liquid Crystal Display (LCD). These ports also support the keypad, speaker, and either an internal thermal or external printer.

The VIC Board's serial ports connect to the Scanner Board (J1), enabling the 68302 microprocessor to communicate with and control the Scanner Board. These ports also support a unidirectional interface and external bar code reader.

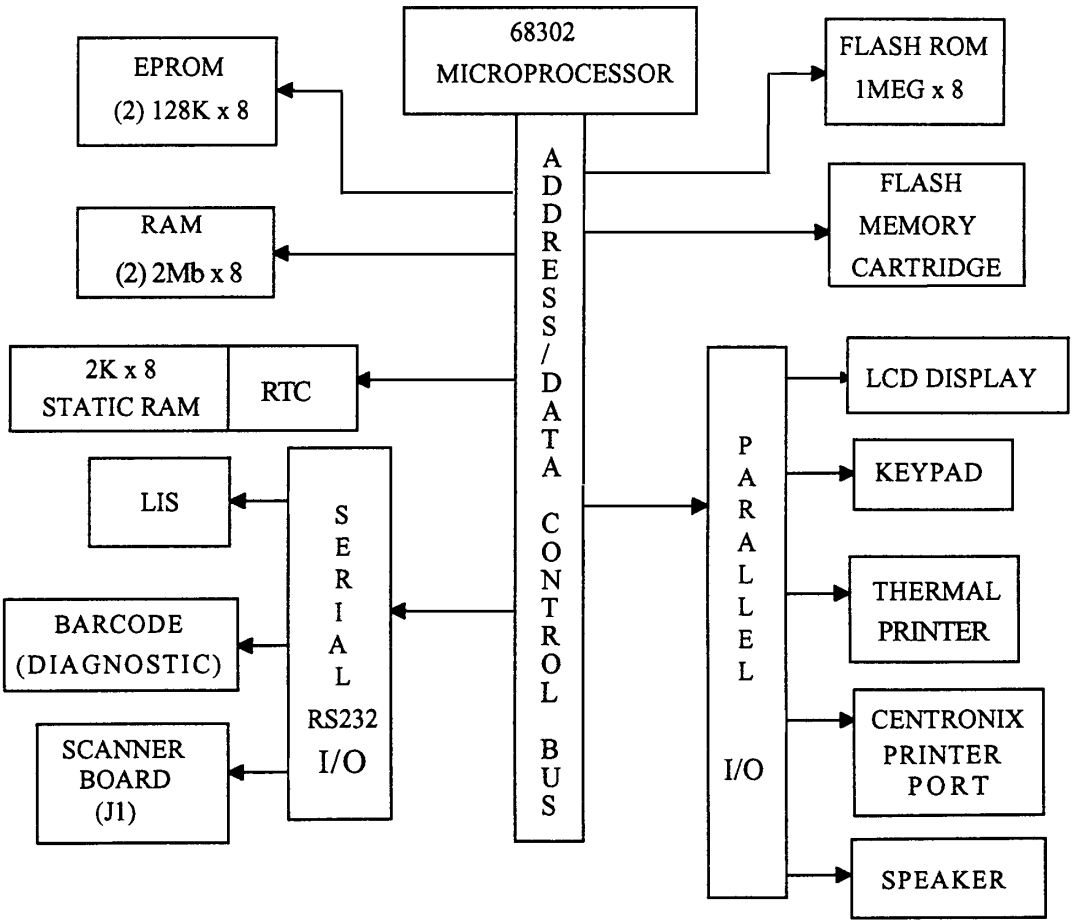


Figure 4-7 Internal Computer Board

Power Supply

The mini VIDAS Power Supply employs a toroidal transformer with an internal Power Supply Board and switching supply. The Power Supply Board provides the following:

- Distributes power from PS1, the +5 VDC; ±12 VDC 40W switching power supply
- Distributes, rectifies and filters power from the toroidal transformer
- Generates the additional voltages and power sequencing required for the mini VIDAS
- Provides test points for all voltage measurements
- Provides temperature regulation of the air inside the power supply
- Provides a fan test feature

For additional information concerning the Power Supplies see Appendix D.

Keypad Screen

All operator interface to the mini VIDAS is provided through menu-driven software residing in the VIDAS Internal Computer (VIC). The operator accesses the software through the Keypad Screen on the front of the mini VIDAS (see Figure 4-8).

The Keypad and Screen provide the following:

1. **Display Screen**. All instructions and messages for operating the mini VIDAS are displayed here.

2. **Option selection keys**. Up to five options can be displayed opposite these keys. The operator selects the desired option.

3. **Numeric keypad**. These keys are used to input numbers into the system or make input selections.

4. **Function keys**. These three keys perform specific functions in the system.

	The **?** key is used to display error messages and information about the screen in which you are working. It also accesses the assay compatibility list.
	The **Previous Screen** key is used to return to the previous screen, a particular menu, or to correct a selection error.
	The **UNDO** key is used to delete the last input made and returns you to the previous screen.

5. **Arrow keys**. These keys are used to move the cursor on certain screens. The **UP** and **DOWN** keys are also used to page the display.

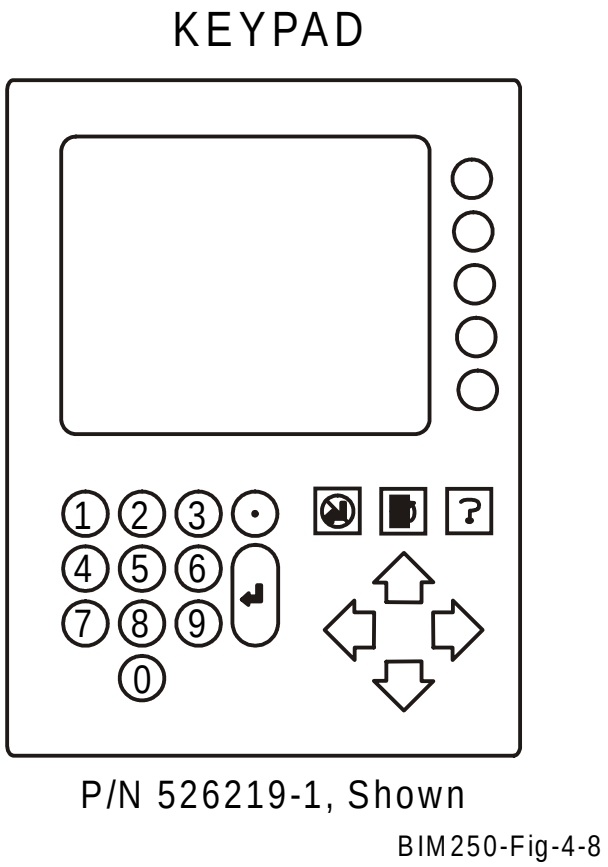


Figure 4-8 Keypad and Screen

Internal Printer

The mini VIDAS includes an internally mounted Fujitsu® Thermal Printer. The thermal printer, located on top of the Keypad/Screen assembly, is the default printer. All results for assays will print on this printer. An option is provided to connect an external printer to the mini VIDAS. Older mini VIDAS have a Seiko® Thermal Printer.

Chapter Five: **Internal Installation**

WARNING! <u>POTENTIAL BIOHAZARDOUS MATERIAL</u> Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

NOTE: Perform routine decontamination of the mini VIDAS before any service or maintenance. See Appendix A of this manual.

This chapter describes how to gain access to the interior of the mini VIDAS and includes detailed information for the removal and replacement of internal subassemblies (circuit boards and mechanical assemblies). This Chapter also describes how to check and align the various mechanical components within the mini VIDAS.

Equipment Required

At times, special tooling is required to perform the necessary mechanical alignments. These tools are listed in the procedure when required. The special tools required in this chapter of the manual are as follows:

Description	Part Number
Tower Phasing Tool	371116-1
Pulley/Bar Code Reader Alignment Tool	371117-1
Tower Belt Tension Gauge (Optional)	371118-1
Scanner Belt Tension Gauge (Optional)	371118-2
Tray Wrench	371147-2
Tray Drive Engagement Tool	371195-1

Outer Covers

To gain access to the interior of the mini VIDAS, open or remove the outer covers as follows:

- Remove power from the mini VIDAS while removing covers or components.

- Remove the front panel to gain access to trays and tray motors. Loosen the captive screws located at the left and right end of the lower front panel. Lift the tray dust covers and remove the front panel by grasping the top edge of the panel and pulling forward to remove it from the mini VIDAS.

☞ **NOTE**: The Front Panel is secured to the base by two (2) safety cables to keep the panel from falling to the floor. If the safety cables are not present order P/N 527611-1.

- To open the top cover, remove the two Phillips screws at the top of the back cover. Support the back cover to prevent damage to the piano hinge. The Incubator and Scanner Boards are mounted on the inside of the back cover.

- The left and right end panels may be removed for easier access to Section A and the Display Enclosure. To remove the end panels remove the shoulder screw at bottom of top cover and the Allen hex screw located in frame member near the Display Assembly. Removing the end panels provides easy access for removal of the Display Enclosure and front trim (LED) panel.

☞ **NOTE**: The VIDAS Internal Computer (VIC) Board is located on the right end panel, as viewed from the front. Take care not to damage the board or related cabling when removing this end panel.

To gain access to the top of the Tower Assembly, proceed as follows:

- Remove the two Allen hex screws holding the Display Enclosure and slide it forward. It is necessary to loosen the Display Enclosure before removing the LED trim panel.

- Remove the Kep nuts located at the left and right ends of the LED trim panel. Carefully remove the trim panel and place it on top of the Tower Plate, taking care not to damage the wiring from the LEDs to the Bay Interface Boards (BIB).

Incubator Board

Two Incubator Boards are mounted inside the top cover (see Figure 5-1) of the mini VIDAS.

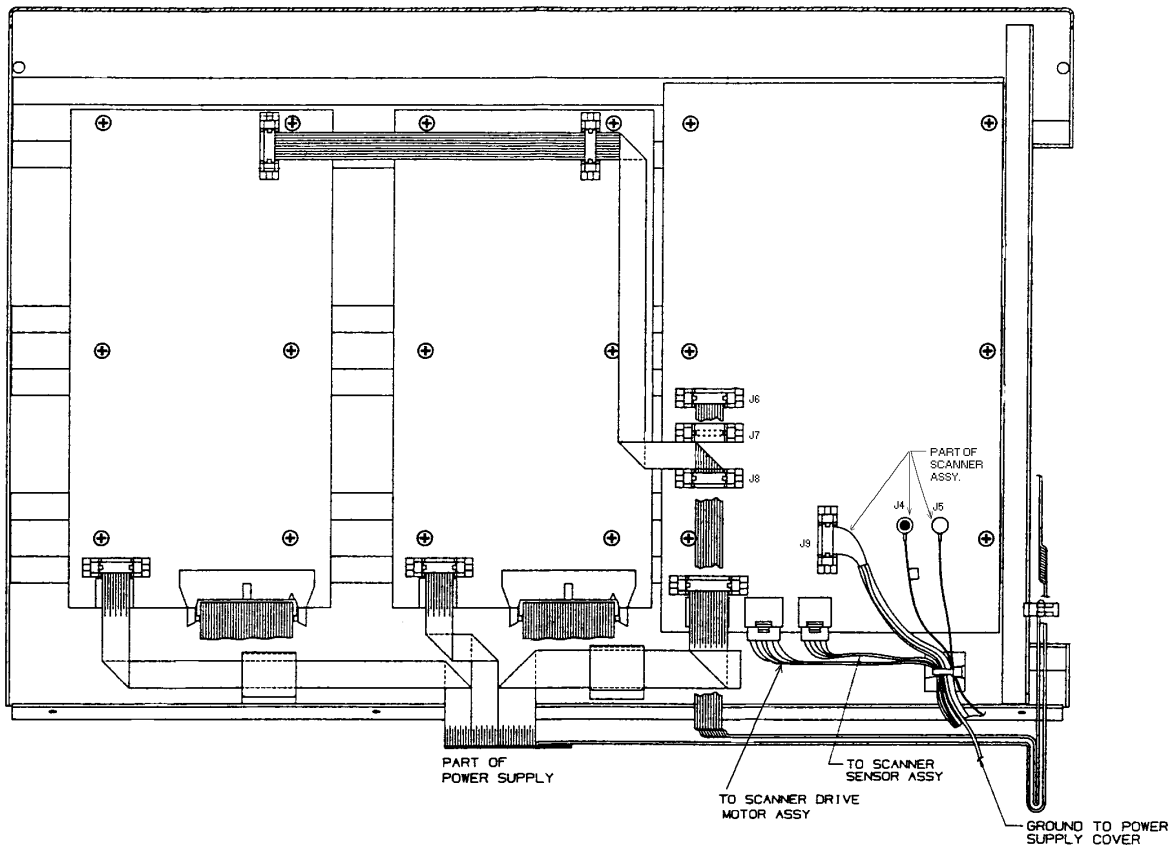


Figure 5-1 Incubator & Scanner Board Locations

To remove an Incubator Board, proceed as follows:

1. Remove power from the mini VIDAS and open the top cover.

2. Disconnect the power connector (J2), the serial interface connector (J3), and the BIB connector (J1).

3. Remove the two Phillips screws used to mount the Board to the center support of the top cover. Then place two fingers under the corner of the Board and gently but firmly pull up to remove the board from the PEM fastener at each corner of the Board.

☞ **NOTE**: There are many **STATIC** sensitive components in the mini VIDAS. The Scanner and VIC boards are particularly sensitive. Use extreme care! Use proper anti-static precautions when working on the mini VIDAS.

4. Verify that the Firmware (Z11) on the replacement Incubator Board is at the same level as the board being removed. Example: DAS30I-RX.XX (X.XX = the version level of the firmware e. g. 2.11). If not, it will be necessary to transfer the Firmware chip from the old board to the replacement Board or install the proper level of Firmware.

5. Verify the ADDRESS and RESET jumpers on the replacement board are the same as the removed Incubator Board, or refer to Appendix D.

6. Install the replacement Incubator Board by pressing down firmly at each corner to seat the board on the PEM fasteners. Install the screws removed in step 3 and reinstall all connectors removed in step 2.

7. Verify all sensor alignments in this section (see Maintenance — Section Alignment).

Bay Interface Board

The Bay Interface Board (BIB) (P/N 527710-x) is located on the tower top plate near the center of the mini VIDAS (see Figure 5-2). The BIB provides interface connection between the motors and sensors in a Section to the Incubator Board for that Section.

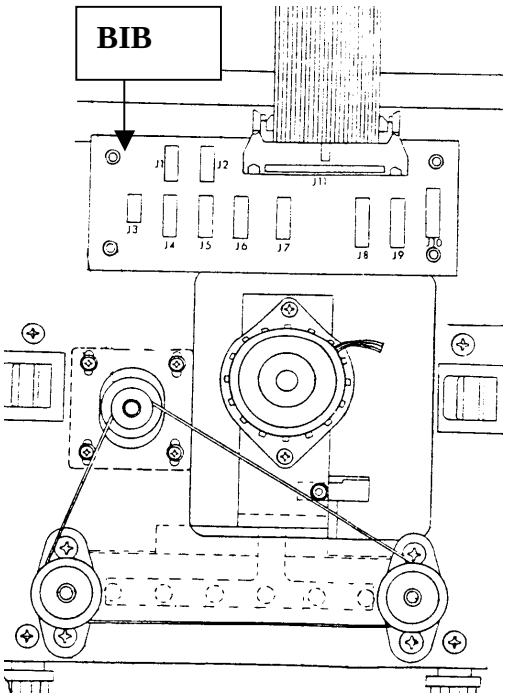


Figure 5-2 BIB Location

To replace a BIB, proceed as follows:

1. Open the Top Cover (see Outer Covers).

2. Disconnect (J11) the ribbon cable to the Incubator Board.

3. Place two fingers under the corner of the Board and gently but firmly pull up to remove the board from the PEM fastener at each corner of the Board.

4. Install the replacement BIB, pressing down firmly at each corner to seat the board on the PEM fasteners.

5. Carefully disconnect connectors J1 through J10 from the old BIB and reconnect to the new BIB.

6. Verify all sensor alignments in this section (see Chapter 6 Maintenance — Section Alignment.

7. At the **MAIN MENU**, enter **3278** on the keypad and press the ↵ key. The **Express Start Menu** will display on the screen. Verify Section operation by performing Test Assays **TP4, TP5**, and **TP6** for the section in which the BIB was replaced.

Scanner Board

The Scanner Board, P/N 527722-4, is located inside the top cover of the mini VIDAS (see Figure 5-1). To remove the Scanner Board, proceed as follows:

1. Open the top cover.

2. Remove/disconnect ribbon cable J9, and coaxial connectors J4 and J5 that come from the Scanner/Carriage assembly. Coax connector J4 should have a white tape flag around the lead and the end of the connector blackened for ease of identification.

3. Remove/disconnect the Power (J11), Scanner motor (J10), and the Home sensor (J12) connectors located on the bottom of the Scanner Board.

4. Remove/disconnect and identify ribbon cables J6 and J8 on the edge of the Scanner Board (toward the Incubator Board).

5. Remove the two Phillips screws used to mount the board to the center support of the top cover. Then place two fingers under the corner of the board and gently but firmly pull up to remove the board from the PEM fastener at each corner of the board.

6. Install the replacement Scanner Board, by pressing down firmly at each corner to seat the Board on the PEM fasteners. Install the screws removed in step 5 and reinstall all connector removed in steps 2 through 4.

7. Verify Scanner Alignments (see Maintenance — Scanner Alignment).

8. Verify Optical Alignments (see Maintenance — Optics Calibration).

Tray Assembly

Trays in the mini VIDAS, are supported in a triangular bearing arrangement on the Locator Plate, which controls the smoothness of movement of the tray. Two bearings are mounted on the left side of the tray. A third adjustable bearing (eccentric) is located on the right side of the tray. To remove the Tray Assembly (P/N 527135-1), proceed as follows:

1. Remove power from the mini VIDAS.

2. Open the Top Cover and remove the Front Panel (see Outer Covers).

3. Remove the Splash Shield Plate.

4. Loosen and lower the tray drive assembly (P/N 527132-x) (see Figure 5-3). Disconnect the tray wiring connector near the base of the mini VIDAS.

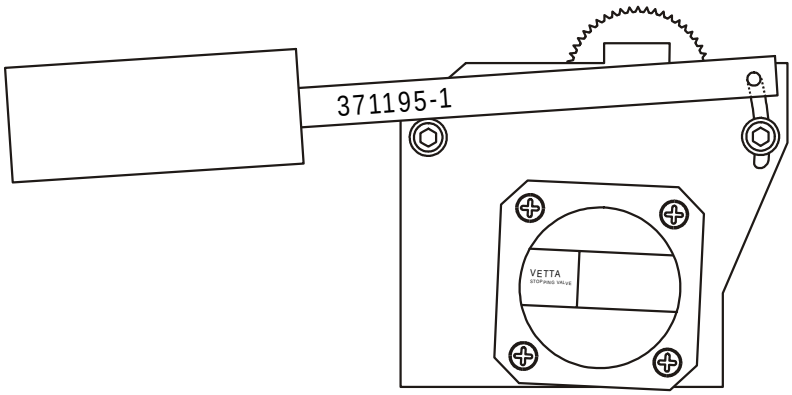


Figure 5-3 Tray Motor Assembly with Tool Installed

5. Push the tray into the interior of the mini VIDAS. Use care when removing the tray, as it is possible to damage the Tray Sensor on the right frame of the Section.

6. Install the replacement tray in the guide rails and roller bearings. Reconnect the tray wiring connector.

7. Mechanically align the tray as follows:

    a. Push the tray partially into the instrument and, while grasping the rear of the tray, verify there is little up-down movement or side-to-side movement. If there is excessive movement of the tray, or if the tray is too tight, proceed to the next step.

    b. Loosen the Allen head screw in the right side bearing. Using the Tray Wrench (P/N 371147-2) adjust the eccentric bearing for minimal endplay, without excessive tension on the tray (see Figure 5-4).

    c. Retighten the Allen head screw in the bearing.

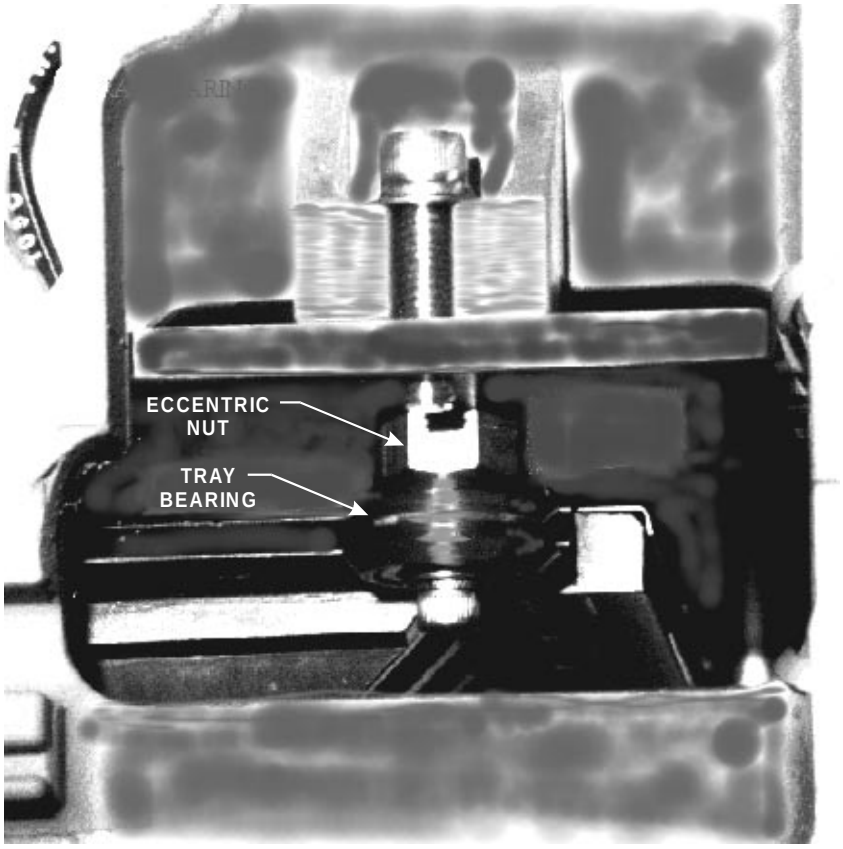


Figure 5-4 Eccentric Bearing

8. Reinstall the tray motor so that its gear fully engages the linear gear on the tray.

9. Install the Tray Drive Engagement Tool (P/N 371195-1) so that the dowel pin is protruding through the top of the slot on the Gear Plate, and the bar is resting on the top of the Assembly's Pivot Screw (see Figure 5-5).

10. Ensure that the top of the Tray Drive is fully engaged with the Tray Gear Rack.

11. Tighten the Tray Drive Assembly mounting screws.

12. Check for "free play" between the Gear Rack and the Tray Drive Gear.

13. Repeat sequence if "free play" is found.

14. Reinstall the Splash Shield Plate.

15. Verify Tray Sensor Alignment (see Maintenance — Section Alignment).

Cocked Tray

A cocked tray exists when the left and right sides of the tray have more than one step difference relative to the Scanhead. This occurs when the two concentric rollers on the left side of the tray are not perpendicular to the Scanhead. This can be corrected by moving one or both of the two left rollers as necessary on their mounting screw, which is smaller in diameter than the mounting hole in the roller bearing. If you need to correct a cocked tray, proceed as follows:

1. Determine which side of the tray (left or right as viewed from the front of the mini VIDAS) is closest to the Scanhead (see Maintenance — Section Alignment, Tray Sensor).

NOTE: In the next step, it may be necessary to remove the tray drive assembly to gain access to the screws holding the concentric rollers so that they may be loosened and moved as necessary (see Tray Assembly in this section).

2. Loosen one of the two concentric rollers' mounting screws on the left side of the tray and move the roller to the left away from the tray as follows:

    a. If the left side of the tray is closer to the Scanhead, loosen and move the roller in the rear (closest to Scanhead).

    b. If the right side of the tray is closer to the Scanhead, loosen and move the roller in the front.

3. After moving one of the two left rollers, tighten it. Recheck and readjust the eccentric roller on the right side of the tray if the tray is now too loose.

4. Reinstall the tray drive assembly, if removed, and check to see if both left and right sides of the tray are now within the one-step specification (see Maintenance — Section Alignment; Tray Sensor). If they are, skip the rest of this procedure and verify Tray Sensor alignment. If the tray still does not meet the one-step specification proceed with next step.

5. Remove the tray (see Tray Assembly).

6. Loosen one of the two concentric (left) rollers' mounting screws again, but this time move the roller to the right, towards the tray.

    a. If the left side of the tray is closer to the Scanhead, loosen and move the roller in the front.

    b. If the right side of the tray is closer to the Scanhead, loosen and move the roller in the rear.

7. After moving one of the two left rollers, tighten it. Reinstall the tray and recheck the eccentric roller on the right of the tray. The tray may be too tight now. If so, readjust the eccentric as necessary.

8. Recheck to see if the tray now meets one-step specification left to right with relation to the Scanhead. If not, repeat the previous 7 steps until the specification is met.

Pump Motor

The Pump Motor (P/N 527146-x, or 527147-x) is replaceable without removing the Pump Assembly. To replace the Pump Motor proceed as follows:

1. Open the Top Cover (see Outer Covers).

2. Disconnect the Pump Motor connector (J8) on the BIB.

3. Loosen the two Phillips screws holding the Pump Motor. **Do not remove the screws** (see Figure 5-5).

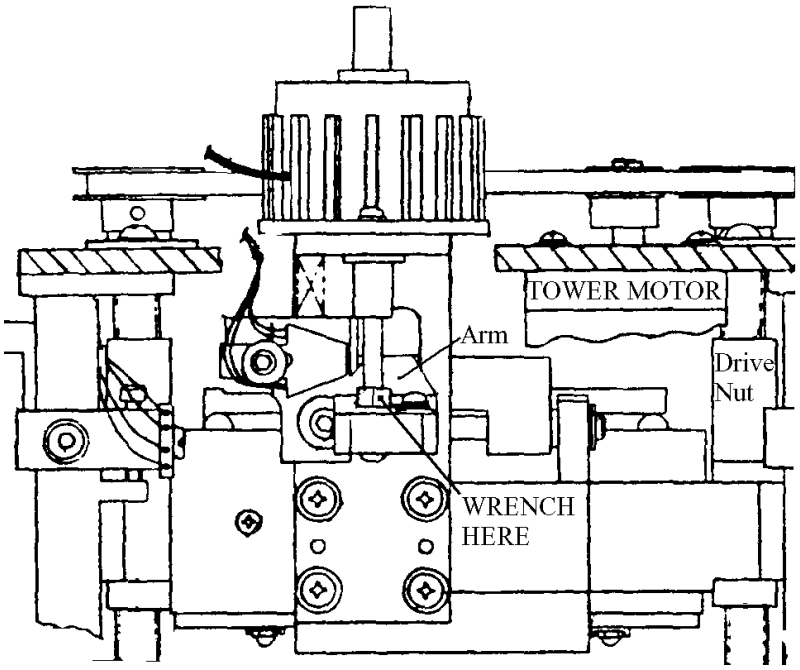


Figure 5-5 Pump Motor Location

WARNING! Use a wrench to hold the adapter end of the motor shaft while removing or installing the screw in the end of the shaft. This will prevent the shaft from spinning, which will damage the motor.

4. Remove screw from the bottom of the Pump Motor that attaches it to the pump arm.

NOTE: Early motors had a round adapter without flats for a wrench. In this case, use pliers to hold the round adapter while removing the screw in the end of the shaft.

WARNING! Make sure the Pump pivot arm does not spring up all the way, when removing the Pump Motor, as this will damage the belloframs in the Pump Assembly. Place something (i.e., Sensor Alignment Tool) between the top of the tripper arm and the bottom of the motor bracket. This will support the arm until the new motor is installed.

5. Remove the screws from the Pump Motor and remove the Pump Motor from the mounting bracket.

6. Install the replacement Pump Motor by reversing steps 1 through 5 above.

7. Run a QCT Assay (see Appendix B) on the section in which you replaced the Pump Motor to verify Pipette Volumes and Section operation.

Pump Assembly

To replace a Pump Assembly (P/N 527148-x) proceed as follows:

1. Open the Top Cover and remove the LED Trim Plate (see Outer Covers).

2. Manually lower the Pump Assembly using the Tower Drive Belt.

3. Disconnect the Pump Motor (J8) and Pump Sensor (J7) cables from the BIB. Make sure the sensor wires are free of all cable clamps and tie wraps.

4. Loosen the Tower Drive Motor and remove the Tower Drive Belt (see Figure 5-5).

☞ **NOTE**: The Tower Drive Motor can be removed for easier access to the Pump Assembly.

5. Remove the screws from the Tower Drive Screw Bearing Retainers on the Pump Tower Plate. Manually unscrew the Tower Drive Screws until they clear the Pump Assembly.

6. The Pump Assembly can now be removed through the back of the mini VIDAS.

7. Install the new Pump Assembly into the section and reinstall the Tower Drive Screws. Before installing the Tower Drive Belt, or tightening the Tower Drive Screw Bearing Retainers, raise the Pump Assembly by hand until the top of the Drive Nuts is just below the bottom of the Pump Tower Plate. The two Drive Nuts should be equally distant from, and close as possible, to the top plate, without touching it.

8. Reinstall the Tower drive belt, removed in step 4, and adjust the Tower Drive Motor so the belt tension matches the other towers (no more than an one-inch deflection). The optional Belt Tension Gauge (P/N 371118-1) can be used for this adjustment.

9. Verify Tower mechanical alignment as follows:

    a. Place the Pulley/Bar Code Reader Alignment Tool (P/N 371117-1) flat on the Top Plate with the small end under the Tower Motor Pulley (see Figure 5-6). Adjust the pulley so that it just touches the Alignment Tool.

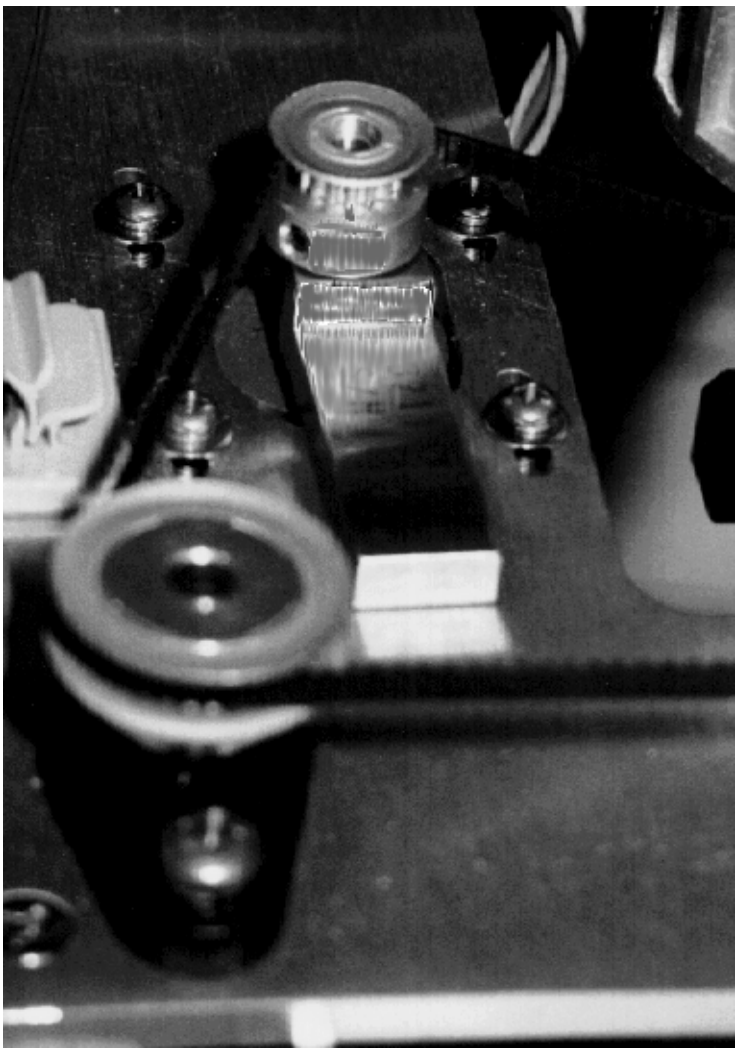


Figure 5-6 Tower Motor Pulley Gap

b. Lower the Tower Assembly by manually turning the Tower Motor Drive Belt until the arms of the Tower Phasing Tool (P/N 371116-1) are easily inserted between the top of the Pump Assembly and bottom of the Top Plate of the mini VIDAS. Then, manually raise the Tower Assembly until the arms of the tool touch the bottom of the Top Plate (see Figure 5-7).

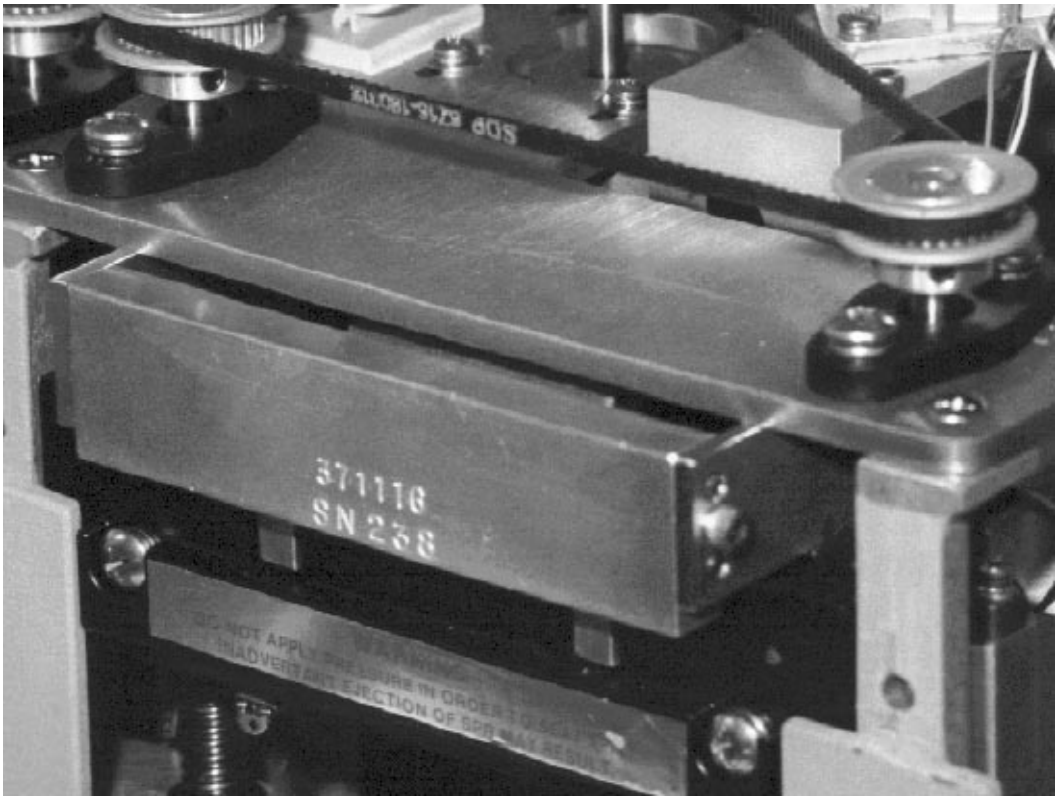


Figure 5-7 Tower Phasing

c. Verify the Tower Phasing Tool has an equal resistance (snug fit) on both sides. If not, loosen the tower drive pulley on the tight side and adjust that drive screw until the loose side appears equal. Then re-tighten the Tower Drive Pulley.

d. Verify the fit of the Tower Phasing Tool. Repeat step c until the adjustment is correct.

e. Adjust the Tower Drive Motor for correct belt tension. The drive belt should not deflect more than 1/8 inch (compare to other sections or use the optional Belt Tension Tool, P/N 371118-1).

10. Verify the Tower Drive Screw Pulleys are flush with the top of the drive screws. Adjust the pulleys if necessary.

11. Verify Pump and Tower sensor alignments (see Maintenance — Section Alignments).

Door/SPR Block

To replace a SPR Block (Liner Guide Assembly) proceed as follows:

1. Disconnect the SPR Block Connector (labeled **TOWER**), located on the Bay Interface Board. Also remove any tie wraps as necessary.

2. Open the SPR Door and remove the two screws from the Slide Block (see Figure 5-8). The SPR Block Assembly (P/N 527139-11) and Slide Block will lift off the door.

3. Remove the two screws that mount the SPR Block Assembly to the Slide Block.

4. Install the replacement SPR Block on the Slide Block and door by reversing the above steps.

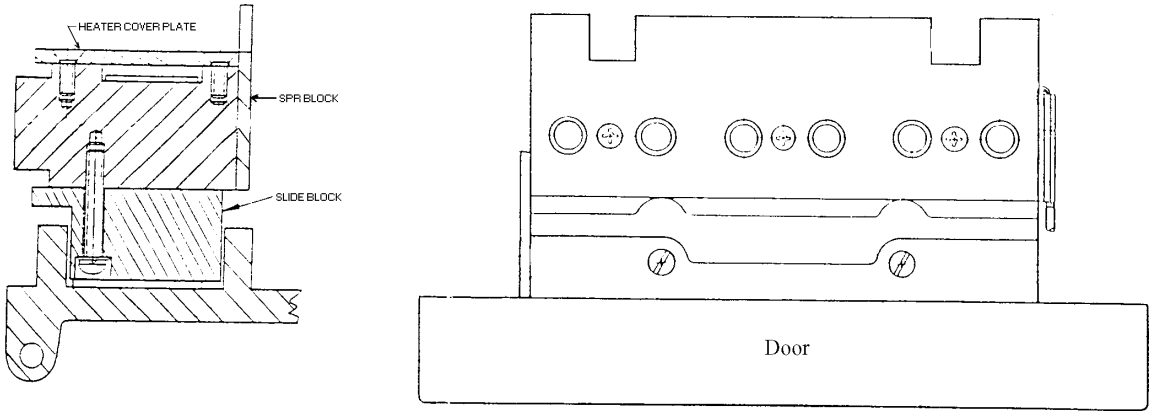


Figure 5-8 SPR Door/Block

SPR Door Slide Block Alignment

Ensure that interference does not occur between SPRs installed in the SPR block and the Grommet Retainer Plate Latches when the SPR Door is being closed.

1. Install SPRs in Positions 1, 2, 5 and 6 of the SPR Block.

2. Move the Pump Assembly either “up” or “down” by hand as required so that the SPRs will just barely pass underneath the Retainer Plate on the bottom of the Pump.

3. Verify that neither of the Retainer Plate Latches are contacted by the SPRs while closing the Door.

4. If the SPRs do not contact the Latches, go to step 8.

5. If the SPRs do make contact with the latches, remove the Slide Block Pins and loosen the two Slide Block mounting screws. Adjust the SPR Block as required and reassemble.

6. Repeat steps 1 thru 5, as required.

7. Adjust the Ball Roller so that the "ball" is not compressed more than 50 to 70% when contacting the flat portion of the Striker Plate. **NOTE:** The adjusting screw is accessible through the left side of the frame member. The metal portion of the Ball Roller should never scrape the flat area of the Striker Plate.

8. Verify that the Door remains open at its detent position (halfway open).

Scanner/Carriage Assembly

The Scanner/Carriage Assembly (P/N 527151-x) is located on the base of the mini VIDAS. The Scanner (Scanhead) rides on a rail and is driven by a lead screw connected to the Scanner Motor. To replace the Scanhead, proceed as follows:

1. Open the top cover and remove the left end panel, as viewed from the front (see Outer Covers). Also remove the right end panel.

2. Disconnect ribbon cable J9, and coaxial connectors J4 and J5 that come from the Scanner/Carriage assembly. Coax connector J4 should have a white tape flag around the lead and the end of the connector blackened for ease of identification.

3. Disconnect the E-Chain mounting on the Scanner Motor Bracket and the GND lead from the power supply of the mini VIDAS.

4. Remove the Scanner Motor Drive Belt from the pulley on the right Scanner Bearing Bracket, as viewed from the front.

5. Remove the left Scanner Drive Screw Bearing Bracket, as viewed front the front of the mini VIDAS.

6. Remove the two screws holding the Right Bearing Retainer to the bearing bracket.

7. Turn the Scanner Lead Screw counterclockwise, as viewed from the pulley end of the lead screw and remove out the right side of the instrument. Now remove the Scanner/Carriage Assembly out the left side of the mini VIDAS.

8. Visually inspect the Scanner Drive Screw for excessive wear, such as peeling of the coating (some chipping is acceptable). Replace the drive screw if necessary. The drive screw does not require lubrication.

9. Clean the Scanner Drive Rail with a damp alcohol swab and re-lubricate with Fluorocarbon Gel or equivalent. **Caution: Do not lube the drive screw**.

10. Verify the E-Chain on the replacement Scanner/Carriage Assembly has no kinks or broken links. Correct as necessary.

11. Place the replacement Scanner/Carriage Assembly on the rail and position it to the left end of the drive rail.

12. Using a finger, press the left front bearing, located under the Scanner/Carriage Assembly, firmly against the drive rail. (Be sure to press on the bearing itself and not the Scanner/Carriage Assembly). If the rear bearing spins freely, it is too loose. If the bearing will not spin, it is too tight. Go to step 13 if adjustment is necessary, otherwise go to step 14.

13. To adjust the bearing, rotate the rear eccentric as follows:

a. Slightly loosen the lockdown nut on top of the scanner bearing support flange, slightly.

b. Using a thin wrench, rotate the hex eccentric, located above the bearing (immediately below the scanner bearing support flange).

c. Retighten the lockdown nut and repeat step 12.

14. Move the Scanner/Carriage Assembly to the right end of the drive rail and repeat the process of step 12 using right bearings. Adjust the right rear bearing per step 13 if required.

15. Reinstall the drive screw by turning it clockwise in the Scanner Drive Nut until the end protrudes out of the left end of the Scanner Assembly. Now reinstall the two screws, removed in step 6, to fasten the right bearing retainer to the right Bearing Bracket. Gently tighten the screws until they are just tight.

16. Loosely reinstall the left scanner drive screw bearing bracket removed in step 5. Reconnect the scanner E-Chain and GND lead.

☞ **NOTE**: Make sure the Scanner Drive Screw has no endplay between the two bearing brackets.

17. Manually move the Scanner Assembly to the left limit. There should be no binding. If binding, adjust the drive screw bearing bracket as necessary for free movement (it may also be necessary to loosen the three screws in the Scanner drive nut). Retighten the left bearing bracket and Scanner Drive Nut screws.

☞ **NOTE**: Never try to adjust the left bearing bracket while the Scanner Motor Drive Belt is installed.

18. Verify the Scanner/Carriage Assembly has no binding when moved to the left limit. If binding exists, repeat the step above, as necessary for minimum binding.

19. Move the Scanner/Carriage to the right limit and verify there is no binding. If binding exists, loosen the two screws (previously secured in step 15) that hold the right bearing retainer to allow the drive screw to center up and move freely in the Scanner Drive Nut. Tighten the bearing retainer screws.

☞ **NOTE**: Never try to adjust the right bearing bracket while the Scanner Motor Drive Belt is installed.

20. Manually move the Scanner/Carriage Assembly from its full left to full right limit. The Scanner Assembly should move smoothly over its full range (left to right) without binding. Repeat steps 17 through 19 as necessary for smooth movement of the Scanner/Carriage assembly.

21. Verify the E-Chain has no kinked links and moves smoothly while manually moving the Scanner/Carriage Assembly from left to right. Adjust links of the E-Chain as necessary.

22. Reinstall the Scanner Motor Drive Belt and adjust the Scanner Drive Motor for correct belt tension. The drive belt should NOT deflect more than 1/8 inch. (Tension may be adjusted using the optional Scanner Belt Tension Gauge, P/N 371118-2.)

23. Reconnect the E-Chain mounting on the Scanner Motor Bracket and the GND lead to the power supply of the mini VIDAS.

24. Reconnect coax connectors J4 (flagged lead; blackened connector) and J5 on the Scanner Board. Also reconnect the scanner ribbon cable to J9 on the Scanner Board.

25. Verify the Scanner Alignments (see Maintenance — Scanner Alignment).

26. Verify Optical alignments (see Maintenance — Optics Calibration).

VIDAS Internal Computer (VIC) Board

The VIDAS Internal Computer (VIC) Board (P/N 526700-4) is located on the inside of the right hand End Panel, as viewed from the front of the mini VIDAS. To remove the VIC Board, proceed as follows:

1. Remove power and open the right End Panel (see Outer Covers).

2. Disconnect the Power (P1), Scanner (J1), Printer (J13), Display (J15 or J10), and Speaker (J11) cables (see Figure 5-9).

3. Disconnect and identify the Keypad (J14) cables.

4. The right End Panel can now be removed for easier access to the VIC Board. Remove the six screws used to mount the board to the End Panel.

5. Install the replacement VIC Board and reinstall the right End Panel by reversing steps 1 through 4 above.

6. Restore power to the mini VIDAS and verify operation of the VIC board as follows:

   - At the **Main Menu** enter **6263** on the keypad and press the ↵ key. The **Test Menu** appears on the screen.

   - Perform all the tests on the **Test Menu**. It is not necessary to check external printer operation if a printer is not available.

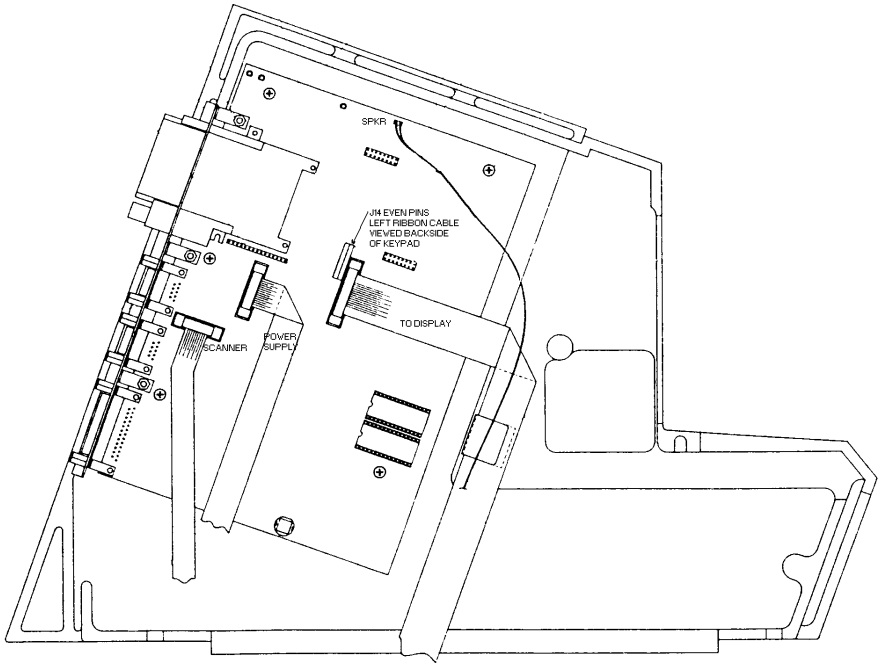


Figure 5-9 VIC Board Location

Keypad / Display / Speaker

To remove the Keypad Assembly (P/N 526219) the Display Assembly (P/N 526105-1) or the Speaker Assembly (P/N 526103-1), proceed as follows:

1. Remove power from the mini VIDAS.

2. Open the Top Cover and the right End Panel (see Outer Covers).

3. Disconnect the Printer (J13), Keypad (J14), Display (J10 or J15) and Speaker (J11) cables from the VIC Board.

4. Remove the two hex head mounting screws that hold the Display Enclosure to the frame.

5. Gently pull the Display Assembly forward out the front of the mini VIDAS.

6. Go to step 7 to remove the Display; step 8 to remove the Keypad; or step 9 to remove the Speaker.

7. If the Display is attached to metal bracket, proceed as follows:

    a. First perform step 8 and remove the keypad.

    b. Remove the four flat-head screws from the front of the enclosure that hold the display bracket.

    c. Remove the four (4) screws and nuts that mount the Display to the bracket. **Be sure not to lose the plastic spacers between the Display and bracket.**

7.1. If the Display is attached directly to the plastic enclosure, proceed as follows:

    a. Remove the four self-tapping screws used to mount the Display to the enclosure.

8. Remove the five nylon nuts securing the Keypad to the enclosure.

9. Remove the four screws, nuts, and washers used to mount the Speaker to the enclosure.

10. Install the replacement part by reversing steps 7 through 9.

11. Reinstall the enclosure by reversing the order of steps 2 through 5.

12. Restore power to the mini VIDAS and verify operation as follows:

    - At the **Main Menu** enter **6263** on the keypad and press the ↵ key. The **Test Menu** appears on the screen.

    - Perform all the tests on the **Test Menu**. It is not necessary to check external printer operation if a printer is not available.

Printer / Printer Board

The following procedure describes how to remove the Thermal Printer, and the Thermal Printer Board.

To remove the Thermal Printer, proceed as follows:

1. Remove power and open the Top Cover (see Outer Covers).

2. Disconnect connectors CN3, CN4, CN5, CN12, and CN13 from the Thermal Printer Board.

3. Loosen the screw on the left and then remove the two screws, on the right, used to secure the Thermal Printer to its bracket.

4. To remove the Printer, push it to the right and then towards the back of the mini VIDAS.

5. Install the replacement Printer by reversing steps 2 through 4 above.

6. Restore power to the mini VIDAS and verify operation of the Printer Board as follows:

   - At the **Main Menu** enter **6263** on the keypad and press the ↵ key. The **Test Menu** appears on the screen.

   - Perform the **Int. Prt Test** and **Ext. Prt Test** on the **Test Menu**. It is not necessary to check external printer operation if a printer is not available.

To remove the Thermal Printer Board, proceed as follows:

1. Remove power and open the Top Cover (see Outer Covers).

2. Disconnect connectors CN3, CN4, CN5, CN12, and CN13 from the Thermal Printer Board.

3. Remove the four screws used to secure the Thermal Printer Board to its bracket and lift the Board up out of the mini VIDAS.

4. Install the replacement Thermal Printer Board by reversing steps 2 and 3 above.

5. Restore power to the mini VIDAS and verify operation of the printer as follows:

   - At the **Main Menu** enter **6263** on the keypad and press the ↵ key. The **Test Menu** appears on the screen.

   - Perform the **Int. Prt Test** and **Ext. Prt Test** on the **Test Menu**. It is not necessary to check external printer operation if a printer is not available.

Power Supply Assembly

The Power Supply Assembly (P/N526101-x) is located on the base in the rear of the mini VIDAS. The Power Supply Assembly contains the following subassemblies:

- PS1 Power Supply (switching), P/N 183067-x
- V12 Power Supply Board, P/N 526702-x
- Fan, P/N 527160-x
- Toroid / AC Power Assembly, P/N 526104-x

To remove the Power Supply Assembly, proceed as follows:

1. Remove power from the mini VIDAS. Open the Top Cover and remove the Left End Panel. (See Outer Covers)

2. Disconnect the following connectors:
   CN1 and CN5 — Printer Board
   J11 — Bay Interface Boards
   J4 — Incubator Boards
   J14 — Scanner Board
   P1 — VIC Board

3. Remove the seven screws securing the Power Supply Cover (see Figure 5-10).

4. Remove the ribbon cables from the retainer clips, on the cover and left side of the Power Supply. Remove the cover by lifting up.

5. Remove the four screws from the outer flange (two per side) and the two screws on the base inside the Power Supply (see Appendix D).

6. Remove the Power Supply Assembly out the left side of the mini VIDAS.

7. Install the replacement Power Supply Assembly by reversing steps 1 through 6.

8. Verify all power Supply voltages (see Maintenance — Power Supply).

9. Verify fan operation after sufficient warmup.

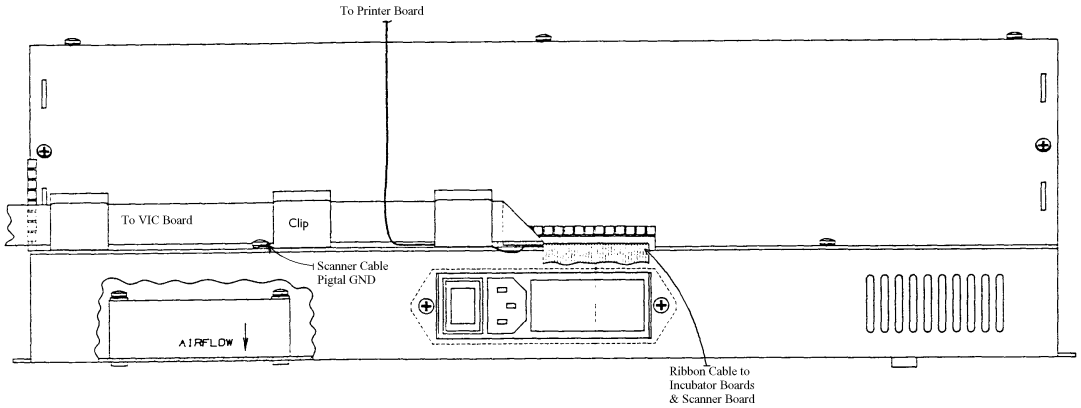


Figure 5-10 Power Supply Assembly

PS1 Power Supply

To remove the PS1 Power Supply (P/N 183067-x), proceed as follows:

1. Disconnect the cables at J1, J2, and P1 (see Appendix D).

2. Remove the four screws used to mount the supply to the back panel of the Power Supply Assembly.

3. Install the replacement PS1 by reversing steps 1 and 2.

4. Verify +5 VDC by measuring the voltage at TP9 to TP11 (gnd) on the V12 Power Supply Board. Adjust R26 on the PS1 Power Supply as required (see Maintenance — Power Supply).

V12 Power Supply Board

To remove the V12 Power Supply Board (P/N 526702-x) from the Power Supply Assembly, proceed as follows:

1. Disconnect the cables at J1, J2, J3, J4, J5 and GROUND (see Appendix D).

2. Remove the nut and lock washer used to secure CR1 to the base of the Power Supply Assembly.

3. Remove the four screws that secure the board to the back panel of the Power Supply Assembly.

4. Install the replacement V12 Power Supply board by reversing steps 1 through 3.

5. Restore power to the mini VIDAS and verify all voltages (see Maintenance — Power Supply).

Fan

To remove the Fan (P/N 527160-x) from the Power Supply Assembly, proceed as follows:

1. Remove the Power Supply Top Cover.

2. Remove the four screws that secure the Fan to the base of the power supply. Removing the PS1 Power Supply gives easier access to the fan.

3. Disconnect cable J1 on the V12 Power Supply Board.

4. Install the replacement fan by reversing steps 1 through 3.

5. Verify fan operation after sufficient warmup.

Chapter Six: **Maintenance**

Chapter Six A: **Section Alignment**

WARNING! POTENTIAL BIOHAZARDOUS MATERIAL — Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

The Sensor Alignment Procedure describes how to check and align the various sensors used to measure and control the mini VIDAS instrument. The mini VIDAS contains two identical sections, also called "Bays." Since each section is aligned independently, the alignment procedure will need to be performed for each of the sections.

NOTE: Perform routine decontamination of the mini VIDAS before any service or maintenance. (See Appendix A of this manual.)

Equipment Required

EQUIPMENT REQUIRED DESCRIPTION	PART NUMBER
Data Terminal	Laptop PC capable of VT-100 emulation. (See Appendix C for terminal setup)
RS232 Cable	186009-1 (25 to 25 pin) or 186039-1 (9 to 25 pin)
Serial Cable	527807-1 (Connects to J7 on Scanner Board)
Sensor / Tray Alignment Tool	371114-1
Tower Alignment Tool	371115-1
QCT Assay	399700-1
Digital Voltmeter	Fluke 87 or equivalent
Feeler Gauge	399124-1

Section Setup

NOTE: Do not lean on mini VIDAS while performing alignments. This will affect sensor settings.

To perform the Sensor Alignments, proceed as follows:

- Open the top cover (see Internal Installations — Outer Covers).
- Connect terminal to the serial cable (P/N 527807-1) and plug into J7 on the Scanner Board.

- Apply power to the mini VIDAS and allow to reset completely. This is accomplished when you see the following message on the screen:

  18 Checkinc: A 9 0 B 9 0 C 99 9 D 99 9 E 99 9

- Verify all power supply voltages. (See Maintenance — Power Supplies)
- Verify the temperature LEDs on both Incubator Boards are blinking after an approximate 20-minute warmup period.
- Type **shell** and press **ENTER**. The terminal will respond with a **:** prompt (skip this step if you are already at the **:** prompt).
- Disconnect the power connector to the Incubator Board of the section you are going to align.

☞ **NOTE**: There are many STATIC sensitive components in the mini VIDAS. Use proper anti-static precautions when working on the mini VIDAS.

- Place the **RUN-TEST** Switch (**SW1**) to the **TEST** position for the section being aligned.
- Reconnect power to board.
- At the **:** prompt on the terminal, type **echo** and press **ENTER**. The terminal will respond with **QUIET OFF** and display a letter prompt for the section being aligned. **In the following procedures, x = the letter (A or B) of the section being aligned.**

☞ **NOTE**: For Incubator Boards that fail to return their board address letter, remove power to the board, then remove the board Reset Address Jumper (JP1 thru P5). Reapply power to the board verify the board echoes its letter address. See Appendix D for Jumper Information. The **rsinc** command should also be able to wake up a non-responsive incubator board.

Door Sensor

1. With the SPR door closed, place the long end (.125 inch thick) of the sensor/tray alignment tool (P/N 371114-1) between the tip of the Door Sensor and the SPR block (see figure 6-1 for Sensor location). Adjust the Door Sensor (see figure 6-2) as necessary to obtain the proper gap with the door closed.
2. Verify operation of the Door Sensor by observing that the Door LED on the Incubator Board turns **ON** and **OFF** when you open and close the door.

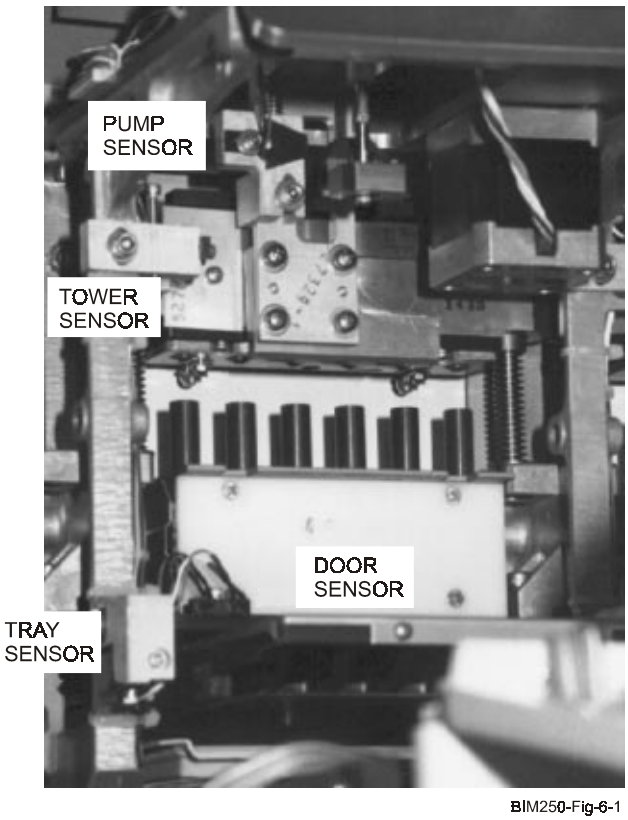


Figure 6-1 Sensor Location

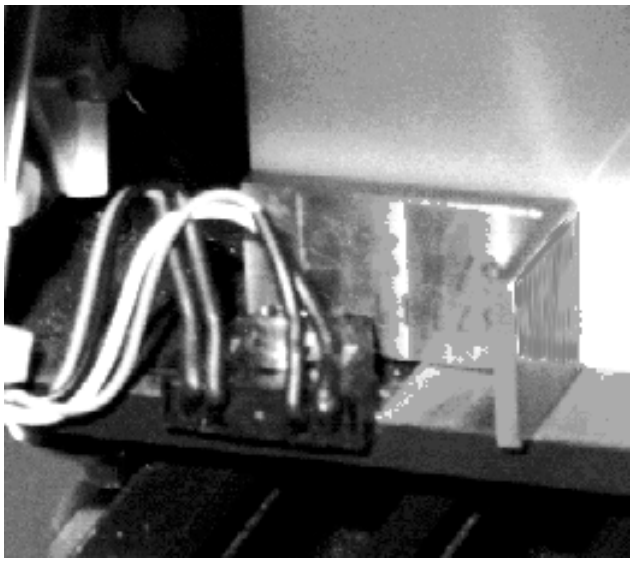


Figure 6-2 Door Sensor

Pump Sensor

1. Open the section door and at the letter prompt type **motor spr speed 1 out 5500** and press **ENTER.** This will lower the tower so that the top of the pump assembly is visible through open door.
2. With the Pump Pivot Arm in front of the Pump Sensor, place the long end of the sensor/tray alignment tool (P/N 371114-1) between the sensor tip and pivot arm (refer to Figure 6-1 for sensor location). Adjust the Pump Sensor (see Figure 6-3) as necessary to obtain the proper gap (.125 inch). Verify the sensor is mounted with the collector (green - white wires) up.

☞ **NOTE**: Earlier units have a reflective surface painted on the arm, that can be chipped while inserting the alignment tool. Care should be taken to prevent damage to this area.

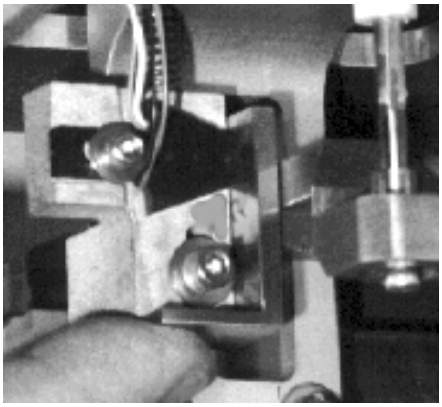


Figure 6-3 Pump Sensor

3. At the prompt **[x]** on screen, type **motor pump home** and press **ENTER**.
4. Verify that the upper pistons are flush with the top of the pump assembly. Since the pistons might vary slightly in position from one to another, flush is defined as the average of the position of the two outer pistons.

☞ **NOTE**: Most sensors in the mini VIDAS are mounted on brackets which have a built-in adjusting set screw (refer to Figure 6-1). Loosen the bracket mounting hex screw before making an adjustment to the sensor. Re-tighten the bracket mounting after making the adjustment.

5. If the upper pistons are not flush with the top of the pump assembly, adjust the Pump Sensor (refer to Figure 6-1 or Figure 6-3). After each adjustment verify the pistons are flush with the top cover plate of the pump assembly by typing **home** and pressing **ENTER**. To adjust the sensor proceed as follows:

   - Turn the setscrew clockwise (**CW**) to adjust the pistons higher.
   - Turn the setscrew counter clockwise (**CCW**) to adjust the pistons lower.

6. Once the sensor is aligned, raise the pump assembly by typing **motor spr in 5500** and pressing **ENTER**.

Tray Sensor

1. Push the tray fully into the mini VIDAS until it stops. Place the long end of the sensor/tray alignment tool (P/N 371114-1) between the Tray Sensor tip and side of the tray. Adjust the Tray Sensor (see figure 6-4) to obtain the proper the gap (.125 inch). Verify the sensor is mounted with the collector side (green - white wires) toward the back of the mini VIDAS

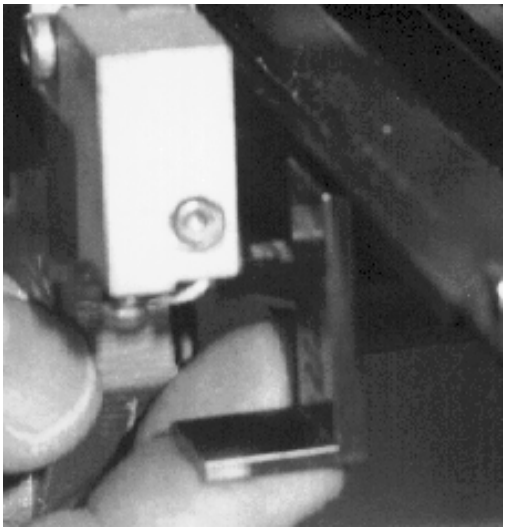


Figure 6-4 Tray Sensor

2. At letter prompt **[x]**, press **CTRL X** to return to **:** prompt. At **:** prompt type **moff** and press **ENTER**. This will turn off the scanner motor. Then type **echo** and press **ENTER** to return to the letter prompt, **[x]**.
3. Manually move the Scanner/Carriage Assembly to the right edge of the tray being aligned, as viewed from the front, and pull the tray back out.
4. Set the long end of the sensor/tray alignment tool flat on the Scanner, with the short end of the tool pointed down. Push the tray back to the tool, to position the tray at the correct distance (0.598 inch) from the bar code bracket on the Scanner Assembly (see Figure 6-5).

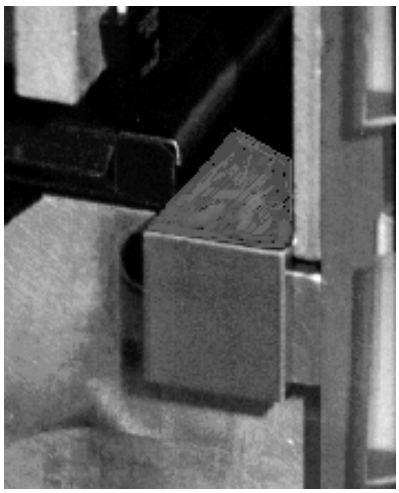


Figure 6-5 Tray to Scanhead Relationship

☞ **NOTE**: If the Tray Sensor was replaced, adjust the Tray Sensor bracket until the Tray LED is ON; then adjust the bracket until the LED just goes OUT. Turn the adjustment screw an additional ¼ turn and proceed with step 6.

5. Remove alignment tool from the Scanner. At letter prompt, **[x]**, on screen type **motor tray** and press **ENTER**.
6. When letter prompt returns, type **home in 1** and press **ENTER**. Tray should move to home position plus one step.
7. Now gently try to insert alignment tool between back of tray and Scanhead. The tool should just slide into position **(do not force)**.

☞ **NOTE**: To determine if the alignment tool fits too loose, slide a 0.003 inch feeler gauge between back of the Scanhead and the tool. If the tool still moves freely with no resistance, it is too loose.

8. If the alignment tool fits loosely or won't slide in, loosen the mounting screw on the Tray Sensor Bracket and turn the set screw on the back of the sensor block; **CW** (Clockwise) to adjust the tray away from the Scanner, **CCW** (Counter clockwise) to adjust the tray closer to the Scanner.
9. Remove the alignment tool and repeat steps 6 through 8 until the Tray sensor is properly aligned.
10. Once sensor is aligned, re-tighten the sensor bracket and recheck alignment (readjust if necessary). Remove the alignment tool when finished.

11. Move the Scanhead to the left side of the Tray and repeat steps 6 and 7. If the alignment tool fits differently on both sides of the Tray by more than one (1) step, the Tray is cocked. Check mechanical alignment of the Tray (see Internal Installations — Cocked Tray).

☞ **NOTE**: This means that the alignment tool must fit properly on the left side of the tray when using one of the following commands: (home), (home in 1), or (home in 2). If it doesn't, you have a cocked tray, which must be corrected.

12. At the prompt, **[x]**, type **out 660** and press **ENTER**.

Tower Sensor

1. With the reflective plate on pump assembly in front of Tower Sensor, place the long end of the sensor/tray alignment tool, P/N 371114-1, between the reflective plate and the sensor tip. Adjust the Tower Sensor to obtain the proper gap (.125 inch). Verify the sensor is mounted with the collector side (green - white wires) up. (Refer to Figure 6-1 for sensor location.)
2. Install the metal SPRs of the tower alignment tool (P/N 371115-1) into the two outermost SPR holders, and close door.
3. At the prompt, **[x]**, type **motor spr out 3250 home** and press **ENTER**. The Tower should move to its home position.
4. Place the tower alignment tool plate on the tray and gently slide it back until it stops. **Do not force**. The plate may touch the SPRs before it slides all the way to the back of the tray.

☞ **NOTE**: On some trays, the reflector on the back of the tray will sit higher than the top of the tray. If this is the case, then do not slide the plate onto the reflector, as this would affect proper alignment.

5. At the prompt, **[x]**, type **cal** and press **ENTER**. The Calibration menu will appear on the screen.

6. Use either the **I** key (**up**) or the **O** key (**down**) to move the pump assembly until one or both of the metal SPRs just touch the top of the plate. Each press of the **I** or **O** key moves the tower motor one step.

☞ **NOTE**: It is not unusual for one SPR to contact the alignment plate before the other. When this occurs, use a 0.030 inch feeler gauge to measure the gap of the SPR not touching the plate. If the gap is greater than 0.030 inch, you may have a mechanical problem or the mechanical phasing (alignment) of the tower drive is incorrect. Correct the problem before continuing (see Internal Installations — Pump Assembly).

7. Loosen the Tower Sensor bracket mounting screw and adjust the setscrew, mounted on top of the Tower sensor block (Refer to figure 6-1), until the Tower LED on the Incubator Board is ON; then adjust the sensor until the LED just goes OUT.
8. Type **X** to return to the **[x]** prompt. Then pull the alignment plate out to the front of the tray, to prevent jamming in the next step.
9. At the prompt, **[x]**, type **home.** The Tower should move to its home position.
10. Now gently try to slide alignment plate back under alignment SPRs. Tool should just slide into position **(do not force)**. If tool fits loosely or won't slide in, readjust sensor as necessary.

    - **CW** (clockwise) to move the tower up.
    - **CCW** (counterclockwise) to move the tower down.

☞ **NOTE**: To determine if tool fits too loose, slide a 0.002 inch feeler gauge between the plate and closest SPR. If the feeler gauge moves freely with no resistance, it is too loose.

11. Repeat steps 9 through 10 until the sensor is properly aligned.
12. Once the Tower Sensor is properly aligned, retighten the sensor bracket and recheck alignment (readjust if necessary).
13. At the prompt, **[ ]**, type **in 3250** and press **ENTER**. Remove the alignment plate and metal SPRs.

Section Completion

1. Press **Ctrl X**. The colon, **:** , prompt should return to the screen.
2. Disconnect the power connector (J2) to the Incubator Board of the section you just finished aligning.
3. Place the **RUN-TEST** Switch (**SW1**) to the **RUN** position (Incubator Boards P/N 527720); or move jumper **JP14** (Incubator Boards P/N 527700) to the top two pins (1-2) for the section being aligned.
4. Reinstall the Reset Address Jumper, if removed earlier.
5. Reconnect power connector (J2) to the Incubator Board.
6. At the prompt **:** type **rsinc ?** and press **ENTER** (substitute the letter of the section you aligned for the question mark). Verify the section resets.
7. Repeat this alignment procedure for each section to be aligned.
8. If no other section is to be aligned cycle power to the mini VIDAS
9. If no other adjustments are to be performed, run QCT (refer to Appendix B).

Chapter Six B: **Scanner Alignment**

WARNING! POTENTIAL BIOHAZARDOUS MATERIAL — Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

The Scanner alignment procedure must be performed in its entirety if a scanhead is replaced. Also, all sections must be aligned before the Scanner can be aligned.

NOTE: Routine decontamination of the mini VIDAS should be performed prior to any service or maintenance. See Appendix A of this manual.

Equipment Required

EQUIPMENT REQUIRED DESCRIPTION	PART NUMBER
Data Terminal	Laptop PC capable of VT-100 emulation. (See Appendix C for terminal setup)
RS232 Cable	186009-1 (25 to 25 pin) or 186039-1 (9 to 25 pin)
Serial Cable	527807-1 (Connects to J7 on Scanner Board)
Sensor / Tray Alignment Tool	371114-1
Pulley / Bar Code Reader Alignment Tool	371117-1
Bar Code Alignment Strip	380255-1
QCT Assay	399700-1
Feeler Gauge	399124-1

Setup

To perform the Scanner/Carriage Assembly Alignments, proceed as follows:

1. Open the top cover (see Internal Installations — Outer Covers).
2. Connect terminal to the serial cable (P/N 527807-1) and plug into J7 on the Scanner Board.
3. Apply power to the mini VIDAS if it isn't already, and allow to reset completely. This is accomplished when you see the following message on the screen:
4. **18 Checkinc: A 9 0 B 9 0 C 9 0 D 99 9 E 99 9**
5. Verify all power supply voltages. (See Maintenance — Power Supplies)
6. Verify the temperature LED's on all Incubator Boards are blinking after an approximate 20 minute warm up period.
7. Type **notemps** and press **ENTER** on keyboard to turn off temperature reporting.
8. Type **shell** and press **ENTER** on the keyboard to obtain a colon **:** prompt if you do not have one already.

Home Flag

1. At the prompt, **:**, type **moff** and press **ENTER**. This will turn the scanner motor off so that you can move it manually to the Home sensor.
2. Adjust sensor flag on side of Scanhead to be centered in the Scanner Home sensor (see Figure 6-6).

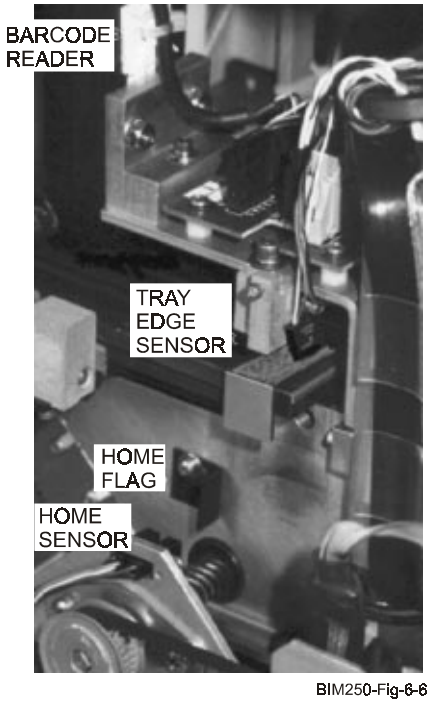


Figure 6-6 Scanner Home Sensor/Flag Location

Solid Standard Bracket

1. Loosen the Solid Standard Bracket and move it up as far as possible to clear the Scan Head. (**Be careful not to bend the bracket**.)
2. Manually move the Scanhead under the Solid Standard Bracket.
3. Place a 0.006 inch (0.15 mm) feeler gauge on the top of the Scanhead and move the Solid Standard Bracket down until it touches the feeler gauge (**do not force it**). Then tighten the locking nut to hold the Solid Standard Bracket in place.

WARNING! Be Careful not to place the feeler gauge over the sapphire window on the Scanhead, as this may scratch and damage the window, and result in incorrect measurements.

Tray Edge Sensor

1. At the prompt, **:** , type **tin b home out 600** and press **ENTER**. Verify tray B moves in and the Scanhead moves to home. Then the Scanhead moves out 600 steps.
2. The Tray is now positioned under the Tray Edge Sensor on the Scanhead. Place the long end of the sensor/tray alignment tool (P/N 371114-1) between the Tray Edge Sensor, (refer to figure 6-6) and the top of the tray reflector.
3. Adjust the sensor to set the gap (.125 inch) between the sensor tip and the top of the Tray reflector. Verify the sensor is mounted with the collector side (green - white wires) toward the right side of the instrument, as viewed from the front.
4. At prompt, **:**, type **tout b** and press **ENTER**. The Tray will move back out to the "**park**" position.
5. At prompt, **:**, type **motorcal b** and press **ENTER**. Tray B will pull into the mini VIDAS and the Scanner Assembly (Scanhead) will move to Tray B. The screen will display **motorcal (XXXX)**, where **(XXXX)** indicates the number of steps to the tray from the "**home**" position.

☞ **NOTE**: A different tray may be substituted for tray B in step 5 above. Just substitute the letter of the tray you wish to use with the "motorcal" command.

6. Using either the **I** key (Scanner in) or the **O** key (Scanner out) move the Scanner so that the right side of the Scanhead is flush with the right side of the Tray . (Each key press of **I** or **O** moves the scanner motor one step). This can be checked by placing the edge of the Tray/Sensor Alignment Tool against the right side of Scanhead and sliding it up to the Tray to see how it meets the edge of the Tray (see Figure 6-7).

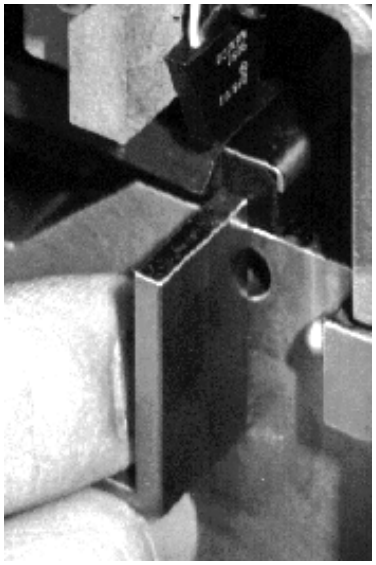


Figure 6-7 Scanhead / Tray Gap Relationship

NOTE: The number which is displayed on the screen when you press **I, O,** (step 6) or **F** (Tray Find) is the position of the Scanhead with reference to the Tray. This number can be used as an aid or reference when performing this alignment.

7. To adjust the position of the Scanner Assembly, loosen the Tray Sensor bracket mounting screw on top of the Scanhead and turn the set screw as follows:

   - **CCW** (Counterclockwise) to move the Scanner **OUT** in reference to the Tray.
   - **CW** (Clockwise) to move the Scanner **IN** in reference to the Tray.

8. Retighten the mounting screw. Then press the **F** key (Find Tray). The Scanner should move and find the edge of the tray.
9. Repeat steps 7 and 8 until the Scanhead edge is flush with the side of the Tray and is within ± 2 steps from "**Find**" as follows:

   - Type **F** to find the edge of the tray and then type **I** twice. Place the edge of the Tray/Sensor Alignment Tool against the right side of Scanhead and slide it up to the back of the Tray. The Tray Alignment tool should be able to slide freely up to the top of the Tray.
   - Type **F** to find the edge of the tray and then type **O** twice. Place the edge of the Tray/Sensor Alignment Tool against the right side of Scanhead and slide it up to the back of the Tray. The Tray Alignment tool should hit the edge of the Tray.

10. Press **Q** when alignment is complete. This will move Tray C back out and return you to the prompt.
11. At prompt, **:**, type **motorcal a** and press **ENTER**, check to see that the Scanhead lines up with the edge of the tray within ± 2 steps. If not, realignment is necessary.
12. On units with the stainless steel reflector on the back of the tray, the reflector itself may need to be adjusted left or right if you have trouble meeting the ± 2 step requirement above.
13. Repeat step 11 for all sections, but substitute the section letter in the **motorcal** command, to verify that the Scanhead is within ± 2 steps of being flush with each and every tray. If not, realignment is necessary.

Bar Code Reader

1. Insert Bar Code Test Strip (P/N 380355-1) into slots 3 and 4 of Tray B.
2. At prompt, **:**, type **tfb** and press **ENTER**. This will move Tray B in and move the Scanhead to the tray.
3. At prompt, **:**, type **tos 9** and press **ENTER**. This will move the Scanhead to slot B-3.

4. Loosen bar code reader mounting screws and insert Pulley / Bar Code Reader Alignment Tool (P/N 371117-1) on edge between reader and the Test Strip (see Figure 6-8). Adjust the Bar Code Reader to touch the tool and retighten the mounting screws. (This will space or focus the bar code reader 0.5 inch above the strip. A different focal length may be necessary as required by a later step.)

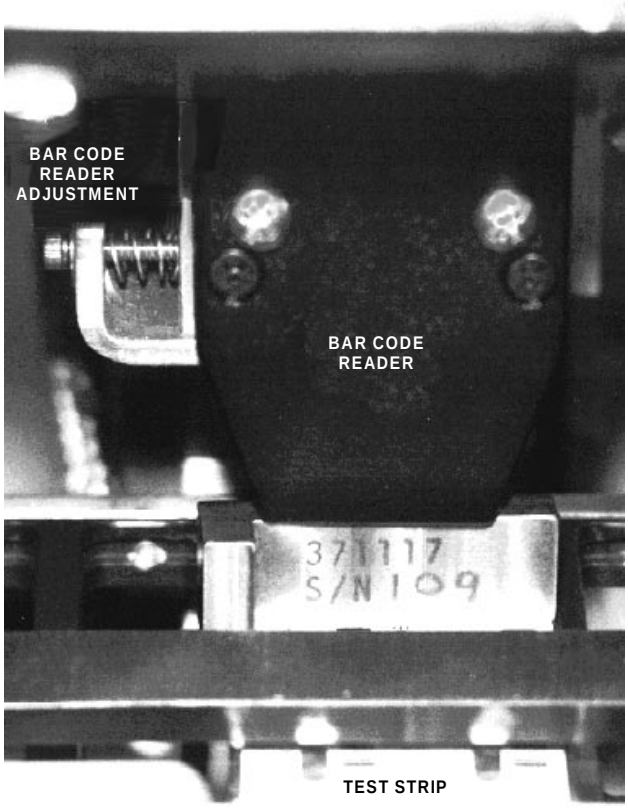


Figure 6-8 Bar Code Reader Alignment

5. At prompt type **bca 9** and press **ENTER**. This will cause the bar code reader to hunt for the bar code and find center.
6. Loosen the bar code adjustment lock down screw (behind bar code reader) and turn the adjustment screw (left of bar code reader) the direction and number of turns specified on the screen. Retighten the lock down screw.
7. Repeat previous step until screen reports that the bar code is centered.

☞ **NOTE**: After the instrument reports "centered" for the bar code in slot 9, it may report being a few steps off if checked with a different alignment strip or in a different slot. This is usually due to part tolerances and is normal. The maximum expected step difference when using two different test strips in the same slot is eight steps. The maximum expected step difference when using the same test strip in different sections of the instrument is six steps. If you see step errors greater than those indicated, then you need to verify quality of test strip and / or tray edge alignment.

8. At the prompt, **:**, type **end** and press **ENTER**. This should exit you from the shell. If the screen reports that you can't exit the shell, reset the power allowing instrument to reset completely (refer to Setup).
9. Type **bi1** and press **ENTER** on the keyboard (no prompt).
10. Insert Bar Code Test Strips into Tray A. Type **bc_a** and press **ENTER**. This will read the bar code on each strip in that tray. When finished with that tray, move the Bar Code Test Strips to Tray B and repeat command substituting the Tray letter for the "a" in the above command.
11. Verify that each strip can be read with a jog of no more than **± 8** in each Tray. Readjust bar code reader if necessary.

☞ **NOTE**: If you experience bar code reading problems such that the diagnostic terminal reports "100 transitions" but still can't read the bar code, the focal length (focus) of the bar code reader may be at fault. To correct the problem, repeat the Bar Code Reader alignment from the beginning but substitute the section that exhibited the problem for Section B as the procedure states. Also remember to substitute the appropriate commands for the section being used

12. If still experiencing problems, repeat the Bar Code Reader alignment but insert a 0.020 inch feeler gauge or spacer between the Pulley/Bar Code Reader Alignment Tool and the Bar Code Test Strip when setting the height of the bar code reader.

☞ **NOTE**: Repeat this step using a 0.040 inch gauge and a 0.060 inch gauge if necessary. If the bar code still fails to read, then check the bar code reader itself and the quality of the bar code printed on the test strip. Correct the problem and realign as necessary.

13. Remove power from the mini VIDAS and restore to normal operation. Power must be reset before returning instrument to customer use.
14. If no other adjustments are to be performed, run QCT to verify instrument operation.

Chapter Six C: **Optics Calibration**

WARNING! POTENTIAL BIOHAZARDOUS MATERIAL — Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

The optics in the mini VIDAS measure the amount of fluorescent compound in a sample. Field calibration of the optics may be required periodically, and must be performed after replacing a Scanhead or Scanner Board. This procedure describes how to calibrate the mini VIDAS using a precision optical standard.

NOTE: Routine decontamination of the mini VIDAS should be performed prior to any service or maintenance. See Appendix A of this manual.

Equipment Required

DESCRIPTION	PART NUMBER
Data Terminal	Laptop PC capable of VT-100 emulation. (See Appendix C for terminal setup)
RS232 Cable	186009-1 (25 - 25 pin) or 186036-1 (9 - 25 pin)
Sensor/Tray Alignment Tool	371114-1
Calibration Standard	399701-1
QCT Assay	399700-1
Digital Voltmeter Meter	Fluke 87 or equivalent

Optics Calibration Checks

Checking the Optics Calibration requires the use of VIDAS Calibrator Strips. Observe the following precautions when using VIDAS Calibrator Strips:

- Keep the Standards cool until ready to use. Do not allow the standards to freeze or get too warm.
- Protect the Standards from light when not in use.
- Allow a 20 minute warm up period before calibrating.
- Make all adjustments using a minimum number of lamp flashes.
- Do not use Liquid Standards older than 60 days from date of manufacture.

To verify mini VIDAS Optics Calibration, proceed as follows:

1. Load the VIDAS Calibrator Strips into the Section A and allow a minimum warmup of 20 minutes.

2. At the **MAIN MENU,** enter **3278** on the keypad and press the ↵ key. The **Express Start Menu** will display on the screen (see Figure 6-9).

3. Select **OPT** from the Assay code list. Both Sections will run the **OPT** assay.

4. After the **OPT** report prints out, calculate the RFU mean value for the VIDAS Calibrator Strips.

5. Check the **OPT** results according to the criteria listed below:

   - Verify that each of the strips reads within ± 100 counts of the average RFU value calculated above. Do not use strips that fail to meet this requirement. Verification of the Optics Calibration requires a minimum of four strips. Repeat the OPT assay, if necessary, with the good strips.

   - Should the average value be within ± 100 counts of the RFU value for the package, it is not necessary to calibrate the Optics. Should calibration be required, select a strip that is close to the calculated mean value as the calibrator, and calibrate per the Optics Calibration Procedure in this Section.

   - After performing an Optics Calibration, run the Calibrator Strips in both Sections and obtain an instrument average. This can be done by performing a TP1 assay in each Section.

   - Calculate a mean value for the TP1 assay. The instrument average must be within ± 75 counts of the RFU value on the package label of the VIDAS Calibrator Strips.

Optics Calibration Procedure

Setup

To calibrate mini VIDAS Optics proceed as follows:

1. Connect the terminal to the serial cable (P/N 527807-1) and plug the cable into J7 (serial) port on the Scanner Board.
2. Verify jumpers JP9 and JP11 are removed from the Scanner Board and switch SW1 is set to RUN.
3. Apply power to the mini VIDAS and allow to reset completely (if not already ON). This is accomplished when you see the follow message on the screen:

   18 Checkinc: A 9 0 B 9 0 C 99 9 D 99 9 E 99 9

4. On the terminal keyboard, type **shell** and press **ENTER**. A colon **:** prompt will be displayed.

Rough Zero Adjustment

1. Connect the voltmeter to the analog ground (lug or **AGND**) and **TP4** (signal channel output) on the Scanner Board. Set the Voltmeter to read DC millivolts.
2. At the **:** prompt, type **o** and press **ENTER**. The lamp in the Scanner Assembly should flash continuously.
3. Adjust **R16**, on the Scanner Board, until the reading on the voltmeter is **+6.0mV to +6.5mVDC**, **with** the lamp flashing. Press the **SPACEBAR** on the keyboard to stop the flashing of the lamp.
4. Move the voltmeter positive lead to **TP2**, on the Scanner Board.
5. Adjust **R36**, on the Scanner Board, for a reading on the voltmeter of **+6.0mV to +6.5mVDC without** the lamp flashing. Disconnect the voltmeter after making this adjustment.
6. At the **:** prompt, type **loop k r** and press **ENTER**. The Scanner readings will be continuously displayed on the terminal.
7. Adjust **R12**, on the Scanner Board, to obtain an average reading of **5 ± 2**. Press the **SPACEBAR** on the keyboard to stop the flashing of the lamp.

Gain Adjustment

1. At the **:** prompt, type **center-dp** and press **ENTER** to center digipots and clear any old standard data from memory. Answer **Y** if asked whether or not you want to erase stored data.
2. Place the selected VIDAS Calibration Strip (see Optics Calibration Check) in Tray A slot 6.
3. At the **:** prompt, type **home tfa** and press **ENTER**. Verify Tray A moves into the mini VIDAS and the Scanner Assembly moves to home and then to the right edge of Tray A, as viewed from the front.
4. Use the sensor/tray alignment tool (P/N 371114-1) to verify the tray position is the correct distance from the bar code bracket on the Scanner Assembly (reference Section Alignment).
5. Use the sensor/tray alignment tool to verify the edge of Tray A is flush with the side of the Scanner assembly (reference Scanner Alignment).
6. At the **:** prompt, type **tos 6** and press **ENTER**. The Scanner will move to tray slot 6 (A-16).
7. Move the **INT/EXT** Switch (SW2), on the Scanner Board, to the **INT** position.
8. At the **:** prompt, type **op** and press **ENTER**. Adjust **R17** (signal channel pot), on the Scanner Board, for a reading of **1000 ± 25**. Press the **SPACEBAR** on the keyboard to stop the flashing of the lamp.
9. At the **:** prompt, type **rr** and press **ENTER** to take a reading. Verify the average reading is equal to **1000 ± 25**. Press **ENTER** to repeat the reading and readjust **R17** as necessary (refer to the example in step 13).

10. Move the **INT/EXT** Switch (SW2) on the Scanner Board to the EXT position.
11. At the **:** prompt, type **op** and press **ENTER**. Adjust **R37** (reference channel pot) on the Scanner Board for a reading equal to the value on the label of the VIDAS Calibration Strips. Press the **SPACEBAR** on the keyboard to stop the flashing of the lamp.
12. At the **:** prompt, type **rr** and press **ENTER** to take a reading. Verify the reading is equal to the value on the label of the VIDAS Calibration Strips ± 25 counts. Press **ENTER** to repeat the reading and readjust **R37** as necessary.
13. Type **rr** and press **ENTER** and observe the following:
    - The Avg. (average) number is less than 4000.
    - The spread is less than 125.
    - The filtered reading is equal to the value of the VIDAS Calibration Standards ± 25 counts.

NOTE: Type **rr** and press **ENTER,** it will provide the following type of screen display:

rr

Filtered:

Avg.	Spread	High	Low	SD	CV
3352	65	3390	3325	19	0.57%

Raw:

Avg.	Spread	High	Low	SD	CV
3354	143	3440	3297	31	0.92%

Final Zero Adjustment

1. At the **:** prompt, type **tout a** and press **ENTER**. Tray C will return to the load (park) position.
2. At the **:** prompt, type **loop k r** and press **ENTER**. Adjust the Zero pot (**R12**) to obtain an average reading of **5 ± 2**. Press the **SPACEBAR** on the keyboard to stop the flashing of the lamp.
3. Type **rr** and press **ENTER** and observe the following:
    - Low is not below 2.
    - High is not greater than 11.
    - Spread is less than 10 (9 or below).

NOTE: High spreads are an indication of a Scanner Noise problem. Check shielding and ground connections and installation, of the ferrite bead for the Scanhead.

Extended Range Check

1. Using the Calibration Standard that is already in place, type **tfa tos 6** and press **ENTER**.
2. At the **:** prompt, type **extr** and press **ENTER**. Verify the difference between the **BR "Avg."** and the **SR "Avg."** readings is less than **50 counts**.

☞ **NOTE**: If the instrument fails this check, verify the DC millivolt adjustment (R16 & R36) and the Zero adjustment (R12) are correct and then recheck extended range.

3. Repeat previous step three times to verify the extended range circuits are functioning properly.

Auto Calibration Value Storage

1. At the **:** prompt, type **store-std** and press **ENTER**, to store the value of the Reference Calibration Standard value in memory.

Final Calibration Check

1. At the **:** prompt, type **end** and press **ENTER** to exit the **shell** diagnostic mode of operation. Disconnect the Terminal from J7 on the scanner board and return the mini VIDAS to its normal operating configuration.
2. Cycle the mini VIDAS power switch to automatically reset the instrument.
3. Place the Calibration Standards in Section A, if not already in place.
4. At the **MAIN MENU**, enter **3278** on the keypad and press the **↵ key.** The **Express Start Menu** will display on the screen.
5. Select **TP1** (Readtest) from the assay code list. Both sections will run the **TP1** assay.
6. The test will start with a read of Tray A. When the tray comes back out, quickly remove the standards from Tray A and install them in the same positions in the next tray. The next tray will automatically start within a minute or so. This test will optically scan all 12 positions across the instrument and will print the results.
7. Verify the average value of all readings is within **± 75 RFU** of the average value of the VIDAS Calibrator Strips.

☞ **NOTE**: If the instrument is out of specification by a large amount (100 RFU or more), repeat Gain Adjustment and Final Zero Adjustment sections of this procedure. Then repeat this Final Calibration section.

8. This completes the Optics Calibration Procedure. Remove and properly store the VIDAS Calibration Strips.
9. Remove the serial cable from J7 in the Scanner Board
10. If no other adjustments are to be performed, run the QCT Assay (see to Appendix B of this manual).

Chapter Six D: **Power Supply Adjustment**

Test points are provided on the V12 Power Supply Board (526702-x), located inside the Power Supply (526101-x) for all voltage measurements. The Test Points and voltages are:

VOLTAGE	TEST POINTS	VOLTAGE RANGE	ADJUSTMENT
+5 VDC	TP9 to TP11 (gnd)	+5.0 ± 0.2 VDC	R26 on PS1.
+12 VDC	TP7 to TP11 (gnd)	+12 ± 0.5 VDC	
-12 VDC	TP8 to TP11 (gnd)	-12 ± 0.6 VDC	
+12 VDC (VPP VIC Board)	TP10 to TP11 (gnd)	+12.0 ± 0.5 VDC	
+10 VDC	TP6 to TP11 (gnd)	+10.0 to 16.0 VDC	
+24 VDC (Thermal Printer)	TP5 to TP11 (gnd)	+24 ± 2.0 VDC	
28 VAC (Heaters)	TP4 to TP3 (gnd)	21.0 to 38.0 VAC	
FAN TEST	TP1 to TP2 (10K ohm resistor)		

Test points are also provided on internal circuit boards for all voltage measurements. The circuit board Test Points and voltages are:

BOARD	TEST POINTS	VOLTAGE
Scanner	TP10 to TP12 (gnd)	+5.0 ± 0.2 VDC
Scanner	TP5 to TP6 (gnd)	+12 ± 0.5 VDC
Scanner	TP7 to TP6 (gnd)	-12 ± 0.6 VDC
Scanner	TP11 to TP13 (gnd)	10.00 to 16.00 VDC
Incubator	TP6 to TP5 (gnd)	21.0 to 38.0 VAC
VIC	TP7 to TP3 (gnd)	+12.0 ± 0.5 VDC (VPP)
Printer (see Note 1)	CN1 - 24V to CN1 GND	+24 ± 2.0 VDC

Note 1: For Seiko printers the test point is CN5 – 24V to CN5 - GND

See Appendix D for additional Board and Schematic information.

Chapter Seven: **Troubleshooting**

Chapter Seven A: **General Troubleshooting**

This chapter contains information to aid in diagnosing problems with the mini VIDAS. Refer to the mini VIDAS Operator's Manual (P/N 527556-x) for additional information.

WARNING! **POTENTIAL BIOHAZARDOUS MATERIAL** – Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

Front Panel Symptoms

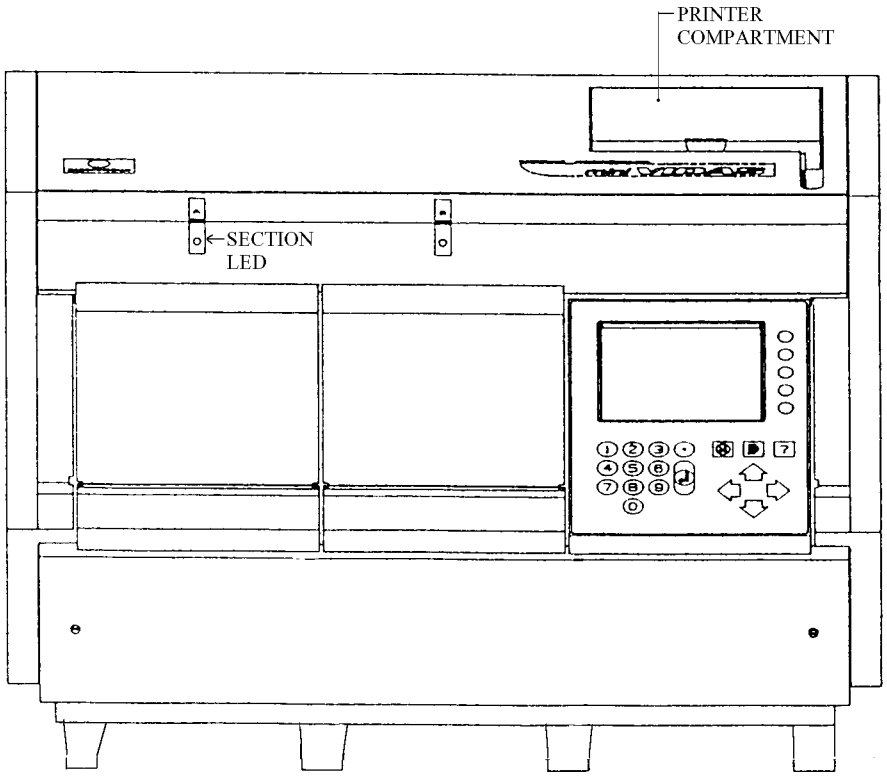


Figure 7-1 mini VIDAS Front Panel Indicators

MESSAGE / SYMPTOM	ACTION REQUIRED
No operation or No Display	• Cycle the power switch on the mini VIDAS (See Figure 7-2). • Verify fuses located in rear of the mini VIDAS (see Figure 7-2). • Check Fuse F2 on the VIC Board. (See Appendix D – VIC Board for fuse location). • Check internal Power Supply fuses (see Appendix D – Power Supply Board for fuse location). • Replace the LCD display.
Section Operating Light is OUT (see Figure 7-3)	• Select **Status Screen** from the **Main Menu**. The LED should be ON if the status is **Run**. The LED will be off when the status is either **Available** (idle), or **Offline**. • Replace the LED.
Section Operating Light is flashing.	• The assay has finished running and that Section is ready to unloaded. • Select **Status Screen** from the **Main Menu**. **Status Screen** display will be UNLOAD.
Keypad buttons do not respond.	• Select **Test Menu** from the Misc. Functions Menu. Then select **Keypad Test** (see Figure 7-4). Press each key on the keypad while observing the display. or • Enter **6263** followed by the ↵ key to access the Test Menu (see Figure 7-5). Then select **Keypad Test**. Press each key on the keypad while observing the display (see Figure 9-6). • Replace the Keypad Assembly.

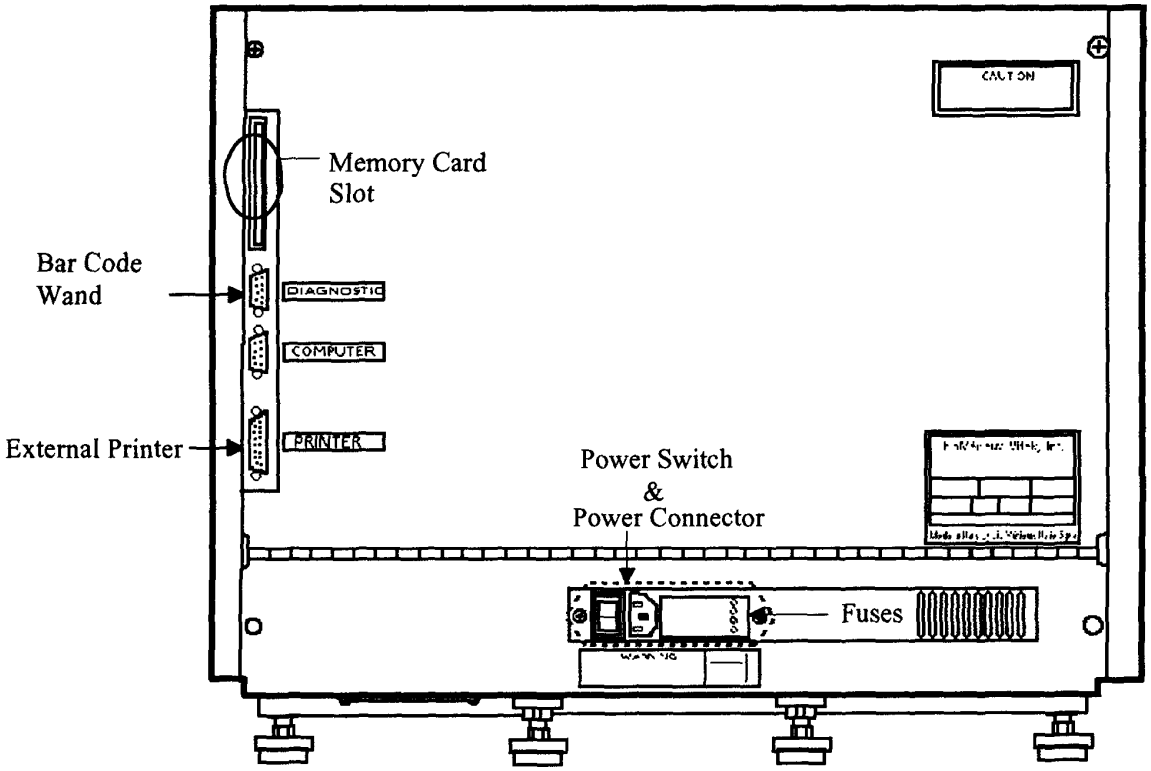


Figure 7-2 Power Switch and Fuse Location

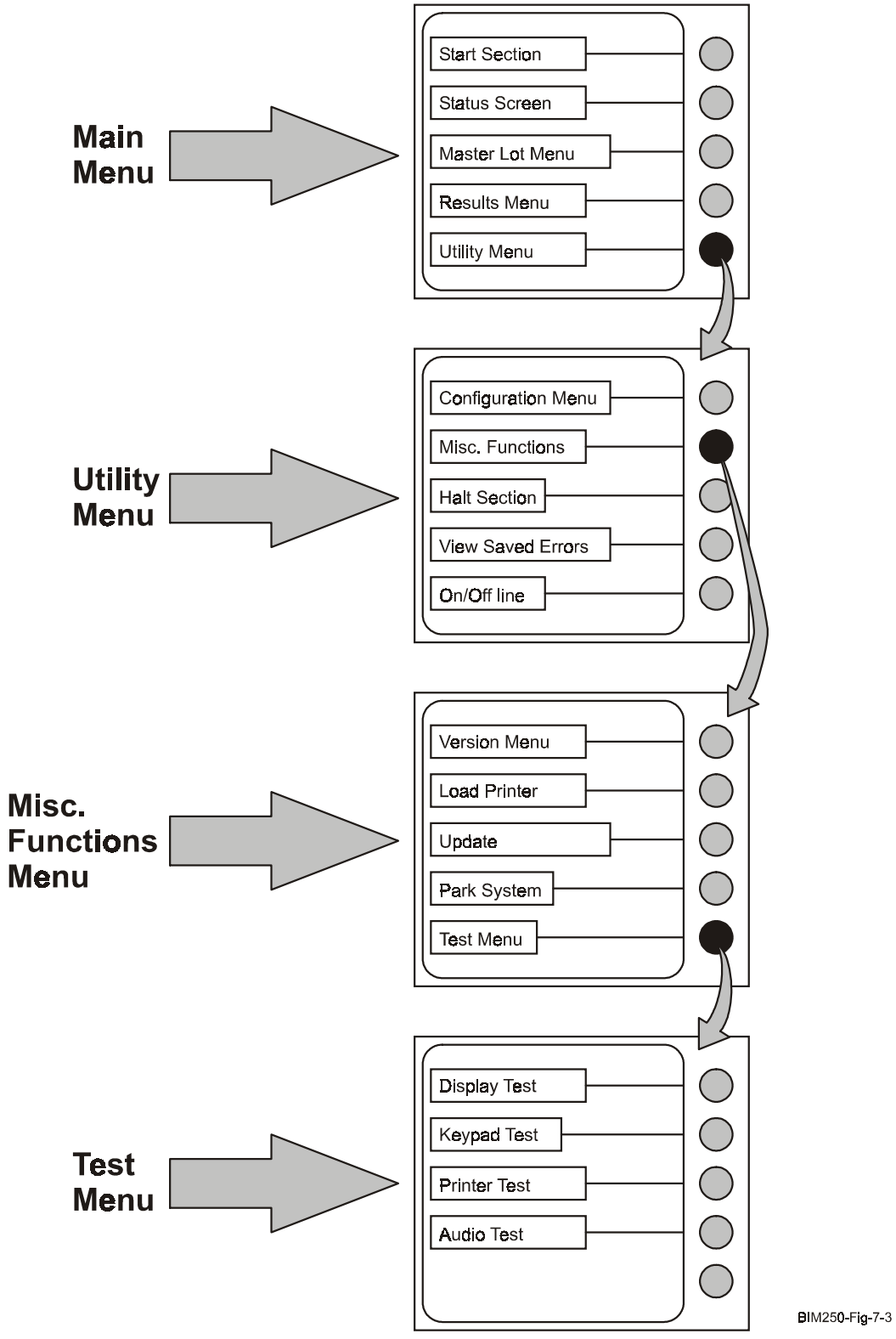


Figure 7-3 Accessing the Test Menu

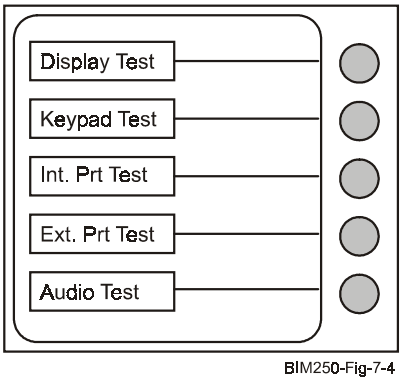


Figure 7-4 6263 Access to Test Menu

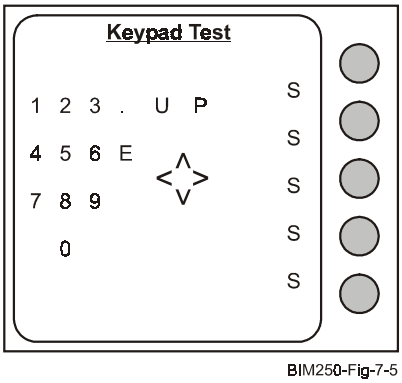


Figure 7-5 Keypad and Test Display

Fuse Panel Removal

To access the main fuses on the mini VIDAS, proceed as follows:

1. Turn AC power OFF (**0**) and unplug the power cord (see Figure 7-6) from the mini VIDAS.
2. Place a small blade screw driver in the slot, and pry off the fuse cover panel.
3. Replace the fuse, located on the cover panel, with the recommended type.
4. Replace the cover panel.
5. Reconnect the power cord and turn AC power ON (**1**).

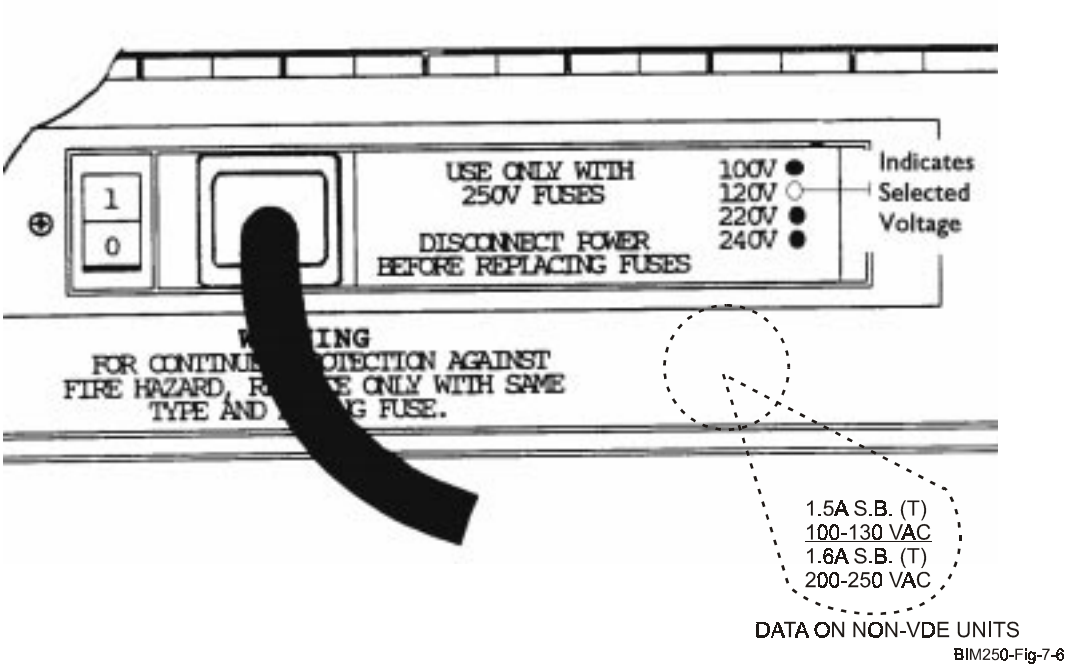


Figure 7-6 Fuse Panel

Error Message Alert System

The mini VIDAS will sound an alarm (beep) and/or flash the display (if enabled) when a serious error occurs. The operator responds to the alarm by pressing the **?** key on the keypad. This action will display the first error message (code) on the LCD screen. Press the ↵ key to display the next error code (if there is another error) or return to the menu and stop the beeping. Two presses of the **?** key will access the **HELP** screen (see Figure 7-7).

Both the audio and visual alarms are controlled by options in the Configuration Menu:

- **Beep Volume**. The volume of the error beep can be adjusted by accessing the **Sound Menu** (see Figure 7-9) from the Configuration Menu (see Figure 7-8). There also are options to set an initial volume and a final volume. The initial volume is the volume used when the beep begins. The volume then increases until you respond, or until it reaches the final volume. It is possible to set both volumes to the same level so that there is no increase in loudness.

- **Display Blink**. There is also an option to enable or disable blinking of the display to accompany the error beep.

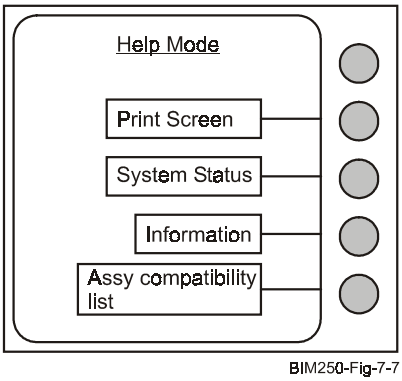


Figure 7-7 Help Menu

The HELP Menu provides the following functions:

Print Screen	Creates a printout of the screen from which you accessed the help function
System Status	Displays current Instrument status
Information	Displays the first online help screen
Assay compatibility list	Displays a list on mini VIDAS assay codes, showing the assays with compatible protocols

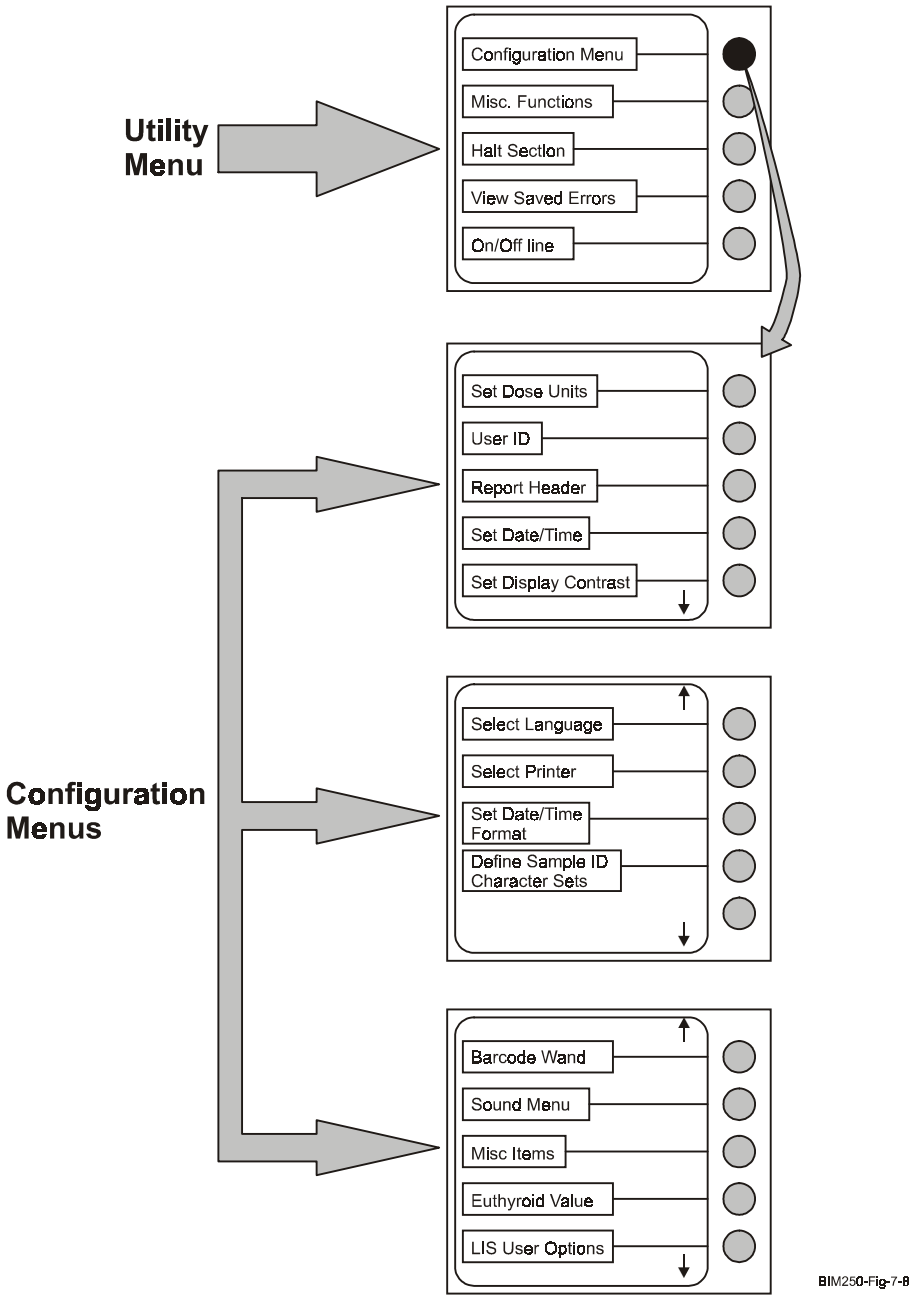


Figure 7-8 Accessing the Sound Menu

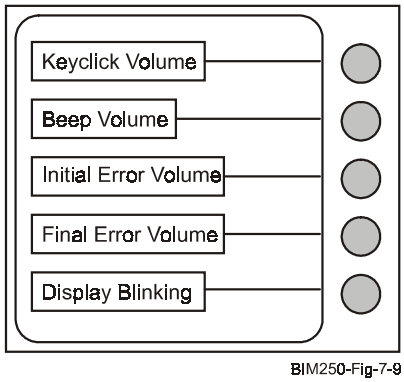


Figure 7-9 Sound Menu

Error Message Screens

There are two types of error message screens on the mini VIDAS. One type displays when a start error occurs during the initial processing of a run of Reagent Strips (see Figure 7-10). The other error message screen consists of an error code number and the error message itself and is reference to a system error. An example of a start error is shown below:

Errorcode: 2073
Time: 11:53 12/14/93
Master Lot Data Bad

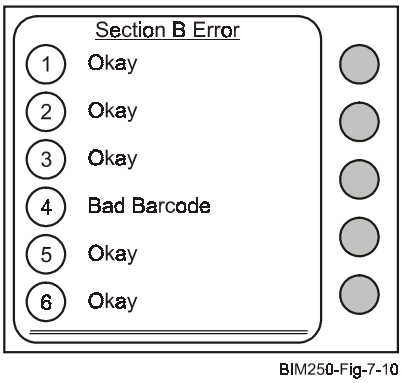


Figure 7-10 Example of a Start Error

Start Errors

A start error occurs when you start a section. The mini VIDAS will go through a series of preprocessing steps that include reading the bar code on each Reagent Strip label, and performing an optical check of the substrate in the cuvette on the strip. When a start error occurs, the system responds as follows:

- **Error Alert**: The error alert system will beep and, if enabled, the display blinks.
- **Halt**: A start error will halt the run in the Section containing the error. The other Section is not affected by this action and will continue with its run.

Press the **?** key to display the error message screen and stop the beeping. A possible start error message (Bad Bar Code) screen is shown in Figure 7-10. The status of each position within the Section having the error will be displayed. A list of start errors with corrective action follows.

START ERROR / SYMPTOM	ACTION
Bad Bar Code Unable to read the bar code on the Reagent Strip	• Press the Number Key corresponding to the position containing the bar code error. The manual bar code entry screen appears. • Manually enter the 8 or 9-digit bar code (located below the three-letter assay code). See the mini VIDAS Operator's Manual for additional information. • Check position of wiring to the Door Sensor if always in Position 6. • Verify Tray Edge Sensor alignment (see Maintenance Scanner Alignment). • Verify Bar Code Reader Alignment (see Maintenance Scanner Alignment).
Bad Sub. Substrate error — background reading above 500 RFU or below 10 RFUs	• Remove reagent strip and transfer specimen to a new assay strip. • Try the reagent strip in another section. If good, check tray edge Sensor alignment. (See Maintenance — Scanner Alignment). • Run an **OPT** assay with the strip. If the reading is: Low — the cuvette maybe underfilled or empty. High — the cuvette may be contaminated. • If problem is intermittent and strips check out okay, run an **OPT** across empty instrument. If readings are: High or inconsistent — check for defective Scanhead, Scanner cable, Scanner Board, or Tray edge sensor. Low ($<5 \pm 2$), but consistent — perform an Optics calibration (see Maintenance).
Incompatible Load and Go Run — Assay in this Position is not compatible with other assays in the Section	• Run the Reagent Strip in the other Section or in a different run.
Misaligned Load and Go Run — Dual Reagent strip has been placed in the wrong Positions	• Move the Dual Reagent Strip so that it occupies an acceptable pair of Positions: 1&2, 3&4, or 5&6.
Okay	• No error in this Position, no action required.
No Strip Defined Run — An assay was specified for this Position but no Reagent Strip was found	• Place a Reagent Strip in the appropriate Position or delete the entry for that Position.
Wrong Type. Defined Run — Assay specified Position is different from the one found	• Put the Reagent Strips in their proper Positions or correct the test entries.

After correcting the error, press the **Previous Screen** key (see Figure 7-11). The following options display:

Cancel — Aborts the run. The system returns to the state it was in before starting the run. Any data entered for the assay is retained.

Restart — Restarts the run. The run resets and starts with another bar code read and substrate check.

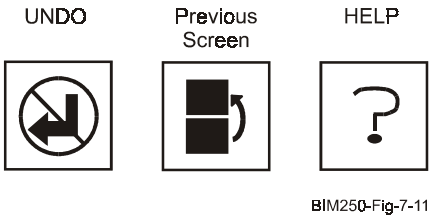


Figure 7-11 Function Keys

System Errors

System errors comprise a broad range of error conditions. When the system detects a system error, the error beep starts to sound and, if enabled, the display starts to blink. The error alert cues continue until you respond to the error condition by pressing the **?** key. This action causes the system to display an error message screen similar to the following:

Errorcode: 2076
Time: 11: 00 1/14/94
Main heap full, adding reserve heap

The above error is also saved by the system. The system maintains a log of the last 10 error messages it has produced. These messages are available until power is shut off to the mini VIDAS. You can access stored messages by selecting **View Saved Errors** from the Utility Menu (see Figure 7-8).

Codes and or Messages are transmitted from the Scanner Board to the VIC Board via the VIDASEP message. The VIC Board processes the VIDASEP message and displays it on the screen. Not all of these error codes display on the screen, but may be observed on a Diagnostic Terminal (Laptop) connected to J7, on the Scanner Board.

NOTE: Cable, P/N 527807-1, is necessary to connect a Diagnostic Terminal to J7 on the Scanner Board.

Error codes for the mini VIDAS fall into four groups:

Exception Errors	Generated by the Central Processor Unit (CPU) on the VIC Board. Replace the VIC Board.
VIDAS Internal Computer (VIC) Software Errors	Generated by the VIC board, and displayed on the operator's screen. These error codes fall into the 2000 - 2999 range.
Scanner Board Errors	Generated by the Scanner Board, and displayed on the operator's screen. These error codes fall into the 1-999 range. Codes above 100 affect instrument operation and are displayed on the screen.
Section Errors	Generated by the Incubator Board, and displayed on the operator's screen. These error codes fall into the 1000-1999 range.

In the sections that follow, all the error code types are described in detail.

Chapter Seven B: **VIC Software Codes/Errors**

The VIDAS Internal Computer (VIC) Board with memory provides complete internal computing capability for the mini VIDAS. The VIC Board not only processes codes from the Scanner Board but also handles software errors generated by itself. These error codes will display on the Liquid Crystal Display (LCD) Screen on the front of the mini VIDAS.

☞ **NOTE**: **Exception Errors** are generated by the CPU on the VIC Board. Replace the VIC Board in all cases.

A complete listing of VIC software errors for the mini VIDAS, with suggested corrective action follows.

VIC CODE	DESCRIPTION	ACTION
2001	Heap out of space	• Cycle power to the instrument
2002	Heap corrupted	• Should not occur at customer site
2003	Invalid Heap block freed	• Should not occur at customer site
2004	Boot **EPROM** wrong table size	• Verify compatibility of VIC software and Boot **EPROMs**
2005	Boot **EPROM** old version	• Verify compatibility of VIC software and Boot **EPROMs**
2006	Proto too big	• Should not occur at customer site
2007	**RUNWL** message but no protocol	• Should not occur at customer site
2008	Bogus RC from receive of %d	• Should not occur at customer site
2009	Bogus T_ status %d	• Should not occur at customer site
2010	Task exited	• Should not occur at customer site
2011	Task aborted	• Should not occur at customer site
2012	@ Invalid Section '@sec@' in bcinfo message	• Should not occur at customer site
2013 2014 2016	Protocol load error	• Reload Assay and Protocol Software • Try a different Software Card • Replace VIC Board
2015	No protocols found	• Reload Assay and Protocol Software • Try a different Software Card • Replace VIC Board
2017	**Warning**: **SRAM** card battery low	• Replace SRAM Card battery (SRAM Card not currently used)
2018	**Warning:** Replace **SRAM** Card battery!	• Replace SRAM Card battery (SRAM Card not currently used)

VIC CODE	DESCRIPTION	ACTION
2019	No assay data found	• Reload Assay and Protocol Software • Try a different Software Card • Replace VIC Board
2020	Internal Printer paper empty	• Install Thermal printer paper
2021	Internal Printer general error	• Enter **6263** on the Keypad and run **Int. Prt Test** • Verify +24 VDC Printer voltage • Replace Printer Board. • Replace VIC Board
2022	Internal Printer busy	• Cycle power (data will be lost) • Verify +24 VDC Printer voltage • Replace Printer Board
2023	Internal Printer ack timeout	• Replace Printer Board
2024	External printer paper empty	• Install printer paper
2025 2026 2027	External printer general error External printer busy External printer ack timeout	• Check cable connections to external Printer • Check Printer • Replace Printer
2028	Invalid message from Scanner	• Retry
2029	@ Invalid section **'**@sec@**'** in incst msg.	• Retry
2030	Invalid section id @id@ in incst msg.	• Retry
2031	@Invalid section **'**@sec@**'** in flinfo msg.	• Retry
2032	Item \"@item@\" on menu \"@menu@\" doesn't have a submenu or an action	• Retry
2033	No assays found!	• Reload Assay and Protocol Software • Try different Software Card • Check cable connections between Scanner and VIC Boards • Replace VIC Board
2034	Invalid section wlid @id@ in secfail msg.	• Retry
2035	Protocol load error	• Reload Protocol Software • Try a different Software Card • Replace VIC Board
2036	@ Invalid language string ID @id@	• Retry
2037	Invalid section in resip	• Retry
2038	@ Section @s@ failed to reset	• Retry • Check for Scanner Error 119
2039	@ Invalid section **'**@sec@**'** in bcodest msg.	• Retry • Check for Scanner Error 121

VIC CODE	DESCRIPTION	ACTION
2040	@ Invalid section wlid @id@ in incst msg.	• Retry
2041	Inconsistent data in flinfo - section name	• Retry
2042	Inconsistent data in flinfo - run ID	• Retry
2043	Invalid section in secfail	• Retry
2044	Inconsistent data in bcinfo - section name	• Retry
2045	Inconsistent data in bcinfo - bad ID	• Retry
2046	@ Invalid section '@sec@' in bctext msg.	• Retry
2047	Invalid field count in bctext	• Retry
2048	Too many assays	• Reload Assay and Protocol Software • Try a different Assay Card • Replace VIC Board
2049	Assay corrupt	• Reload Assay and Protocol Software • Try a different Assay Card • Replace VIC Board
2050	Assay load error	• Reload Assay and Protocol Software • Try different Assay/Protocol Card • Replace VIC Board
2051	Corrupt fake flinfo file - file too short	• Should not occur at customer site
2052	DML Startup file error	• Reload Assay and Protocol Software • Try different Assay/Protocol Card • Replace VIC Board
2053	Strip index out of range	• Should not occur at customer site
2054	No protocol order list found	• Reload Protocol Software • Try a different Protocol Card • Replace VIC Board
2055	Secfail on non-running section	• Should not occur at customer site
2057	Assay load error	• Reload Assay and Protocol Software • Try different Assay/Protocol Card • Replace VIC Board
2058	@ Invalid section id @id@ in bcinfo msg.	• Retry
2059	@Section @sec@ failed to start BC, bcodest failcode @err@	• Check for Section (Incubator) error
2060	@ Section @sec@ failed to start, incst failcode @err@	• Check for Section (Incubator) error
2062	Problem with starting a Section	• Check for Section (Incubator) error
2065	Bad arg count in **vidasep**	• Retry

VIC CODE	DESCRIPTION	ACTION
2066	Analysis routine unhappy	• Should not occur at customer site
2067	Corrupt fake bar code file	• Should not occur at customer site
2068	Corrupt fake flinfo file - missing number	• Should not occur at customer site
2071	Data storage failure	• Replace the VIC Board
2072	Standard save failed	• Delete oldest Standard • Re-run Standard • Replace the VIC Board
2073	Master lot info data bad	• Manually enter Master Lot Data • Re-enter Master Lot Data • Replace Bar Code Reader • Call bioMérieux
2074	Master Lot info save failed	• Delete oldest Master Lot Data • Re-enter Master Lot Data • Manually enter Master Lot Data • Replace Bar Code Reader • Call bioMérieux
2075	No config data found	• Replace U26 on VIC Board
2076	Main heap full, adding reserve heap	• Cycle power at first opportunity
2077	Bad UCI size	• Should not occur at customer site
2078	Bad UCI read	• Should not occur at customer site
2080	Idata compaction failed	• Replace VIC Board
2088	Unknown Heap error	• Should not occur at customer site
2089	Hardware Failure Initialization of Flash Memory on VIC had problem	• Backup all idata and replace VIC Board
2091	Standard @Name@ Expired	• **Warning:** Standard for assay has expired • Rerun Standard for assay
2092	Set variable command failed	• Call bioMérieux
2093	DML Patch load error	• Call bioMérieux
2094	DML Patch load	• Call bioMérieux
2095	DML Patch execution error	• Call bioMérieux
2096	Assay used ainfo that wasn't created	• Call bioMérieux
2097	Error in Assay Data	• Call bioMérieux
2098	Assay not Found	• PTC (Protocol) out of date • Load latest version of Protocol
2099	Copy failed during Backup	• Hardware Problem Replace VIC Board
2100	Copy failed during Restore	• Hardware Problem Replace VIC Board

VIC CODE	DESCRIPTION	ACTION
2101	RTconfig (non-volatile RAM data) restore failed	• Hardware Problem Replace VIC Board
2102	Data card is missing, empty or corrupt	• Replace Data card
2103	Card is not a valid backup set	• Call bioMérieux
2104	Internal BAP software error	• Hardware Problem Replace VIC Board
2105	BAP Protocol hunk save failed	• Hardware Problem Replace VIC Board
2106	BAP Assay hunk failed	• Hardware Problem Replace VIC Board
2107	BAP Patch hunk save failed	• Hardware Problem Replace VIC Board
2108	BAP Kill hunk save failed	• Hardware Problem Replace VIC Board
2109	BAP Hunk is unknown data type	• Hardware Problem Replace VIC Board
2110	Unable to change language	• Call bioMérieux
2111	Unable to load help file	• Call bioMérieux
2112	Assay Data Missing	• PTC (Protocol) out of date
2113	Error saving Dose Unit selection	• Hardware Problem Replace VIC Board
2114	Master Lot info save failed	• Delete oldest Master Lot entry • Re-enter Master Lot Data • Manually enter Master Lot Data • Load latest Software Update • Replace Bar Code Reader • Call bioMérieux Engineering
2115	Master Lot information save failed	• Delete oldest Master Lot entry • Re-enter Master Lot Data • Manually enter Master Lot Data • Load latest S/W Update • Replace Bar Code Reader • Call bioMérieux Engineering
2116	Cannot start Section System Problem	• Check for Scanner Error Codes • Check for Section Error Codes • Call bioMérieux
2117	Cannot start Section Scanner Problem	• Check for Scanner Error Codes • Check for Section Error Codes • Call bioMérieux
2118	**Warning** - LIS validations queue full	• Validate LIS Results! - Results Menu
2119	**Warning** - LIS upload queue full	• Problem with LIS connection! • Check cabling
2120	Bad Card	• Check Card - Card is bad • Replace card • Retry update • Replace VIC Board

VIC CODE	DESCRIPTION	ACTION
2121	Wrong Card	• Check Card - Not S/W or Protocol update • Insert correct card and retry • Replace VIC Board
2122	Bad Card	• Check Card - Card is bad • Replace card • Retry update • Replace VIC Board
2123	Wrong Card	• Check Card - Not S/W or Protocol update • Insert correct card and retry • Replace VIC Board
2124	Update Failed	• Check Update Card Checksum • Replace Card • Retry Update • Replace VIC Board
2125	No room STD pool	• Call bioMérieux
2126	No room in STD pool	• Call bioMérieux
2127	Failed reading NR file	• Call bioMérieux
2128	Failed saving NR file	• Call bioMérieux
2129	LIS results punted	• Problem with LIS connection! • Check cabling
2130	Unable to send message	• Problem with LIS connection! • Check cabling
2131	Unable to communicate with LIS host	• Check cabling, restart host
2132	Standard file open failed	• Call bioMérieux
2134	Standard CTOR failed	• Call bioMérieux
2135	Too many Standards	• Delete some Standards
2136	Protocol not found at assay startup	• PTC out of date • Load latest PTC Card
2137	QC To many QC headers found	• Unused at this time
2138	QC Storage full	• Unused at this time
2139	QC Save for incomplete BlockImage	• Unused at this time
2140	Attempt to up-program flash bits	• Unused at this time
2141	QC block overflow	• Unused at this time
2142	QC Deleting bogus point	• Unused at this time
2143	QC To many QC headers found	• Unused at this time
2144	QC Card Missing, no place to rewrite	• Unused at this time

VIC CODE	DESCRIPTION	ACTION
2145	QCS program failed	• Unused at this time
2146	QCS Compaction failed	• Unused at this time
2147	Master Lot read failed	• Check MLE card • Card loose in holder • Enter MLE Data Manually • Check Bar Code Reader Alignment
2148	General MLE Data Entry Error	• Call bioMérieux
2149 2150	TOS Sheet Errors	• Customer should not use TOS Entry Screen
2151	Master Lot Data, Curve Data Bad	• Check MLE card • Card loose in holder • Enter MLE Data manually • Check Bar Code Reader alignment

Chapter Seven C: **Scanner Codes / Errors**

The status of the mini VIDAS is sent to the VIC Board by the Scanner Board via the VIDASEP message. Scanner Codes range from 1 to 999. Codes that affect operation of the entire instrument (ERR100 - ERR999) will sound an alarm and will be displayed on the operator's screen. These errors may also be observed on the Diagnostic Terminal (laptop).

☞ **NOTE**: Use Cable, P/N 527807-1, to connect a Diagnostic Terminal to J7 on the Scanner Board.

Scanner codes display on the Diagnostic Terminal as shown below:

18 Checkinc: A 9 0 B 9 0 C 99 9 D 99 9 E 99 9
Logging in
Login Failed
WARNING 43
18 Checkinc: A 9 0 B 9 0 C 99 9 D 99 9 E 99 9

WARNING 43 indicates an attempt to log into the VIC Board (Host Computer) has failed. To observe a running total of error occurrences, type the command **errs** on the debug terminal. This accumulation may be zeroed out via the command **cerrs**.

☞ **NOTE**: Scanner Codes below 100 are ADVISORY or INFORMATIONAL and will appear only on a Diagnostic Terminal. These codes provide additional information to help pinpoint the cause of a general error (a code over 100) that appears on the operator's screen. Some codes are not errors at all but were used for informational purposes during instrument development.

A complete listing of Scanner Error Codes, for the mini VIDAS along with suggested corrective action follows.

SCANNER CODES	DESCRIPTION	ACTION
0	Scanner OK	• No errors, all is normal
1	During a bar code read, the tray did not move to the home position when commanded	• Check for error 40 or 41
2	During a bar code read, the tray did not move to the out position when commanded	• Check for error 40 or 41
3	During a bar code read, the tray did not toggle its position when commanded	• Check Tray movement
7	The Scanhead will not leave the home position	• Check for error 144 • Check Scanhead movement
8	The Scanhead will not move to the home position	• Check for error 144 • Check Scanhead movement
9	A bar code was read which contained too few characters	• Information only
10	A **DEL** character was received	• Information only
11	Packet (data) buffer overrun on receive	• Information only
12	Bad checksum received for a packet	• Information only
13	A **SYNC** message was received from the VIC Board (computer)	• Information only
14	A command was received from the VIC Board which contained an illegal character	• Information only
15	A bar code was read which contained too many characters	• Information only
16	The number-of-packets count was invalid	• Information only
17	The **end** packet was received and we were still expecting some data packets	• Information only
18	Bad parameter in packet	• Information only
19	The **end** packet was expected, but not what was received	• Information only
20	Too much time elapsed between receiving the first character of a message and a subsequent character	• Information only
21	Too much time elapsed between receiving the first packet of a message and a subsequent packet	• Information only

SCANNER CODES	DESCRIPTION	ACTION
22	A packet being transmitted to the Host was NAKed	• Information only
23	A packet being transmitted to the Host was neither ACKed or NAKed	• Information only
25	A packet being transmitted to the Host failed to be sent due to too many NAKs	• Check routing of serial cables (noise could be induced on the serial line)
26	Error trying to read an incubator's temperatures	• Information only
27	A retry was made on an incubator poll	• Information only
28	A retry was made for a tray scan	• Information only
29	A reduction in motor speed was made	• Check for Scanhead binding • Check for error 145
30	Unable to find the tray (with the tray edge sensor)	• Tray edge not found, check for code 136, 114 • Verify tray pulls into instrument correctly, check for code 40 • See actions for Code 31
31	Attempt to verify that we have not lost any steps by re-finding the tray edge has failed	• Possible problem with reflective surface on back of tray • See actions for Code 32 • Check for electrically noisy Scanhead (ferrite bead installed) • Check for intermittent ribbon cable on scanhead (cable modification)
32	Attempt to verify that we have not lost any steps by verifying home has failed	• **Warning** the Scanner motor is loosing steps, check for code 75 • Check Scanhead mechanical movement (binding) and alignment • Check for excessive drive screw end play • Check for loose bar code cable catching bottom of pump arm • Check for code 143
33	Too many error messages were generated while not logged in. Some have been dropped.	• Allow module to login to VIC (computer) • Correct cause of other errors
34	Odd internal error	• Information only
35 36	Starter task running too soon/late	• Information only
37	Starter task failed due to the Section being in a state other than **RESERVED** when start time arrived	• Check for code 105

SCANNER CODES	DESCRIPTION	ACTION
40	Error moving tray **in** while trying to establish tray origin	Could be caused by possible missing motor steps • Perform Tray Test (Section Diagnostics)
41	Error moving tray **out** while trying to establish tray origin	Could be caused by possible missing motor steps • Perform Tray Test (Section Diagnostics)
42	Attempt to read an incubator's version failed	• Bad Firmware
43	Attempt to log into the Host Computer (VIC) has failed	• Information only
45	An air reading was equal to zero	• Check the zero adjustment on Scanner Board (see Alignments — Optics Calibration)
46	A tray origin was reset due to minor drift	• Clean Tray edge reflective surface
47	Non-volatile RAM checksum failed	• See errors 157 and 158
48	Optics were recalibrated	• Autocalibration of optics was performed
49	Timeout waiting for A/D Convertor	• Check jumper **JP10** on the Scanner Board
61	A protocol was reloaded	• Information only
62	A packet being transmitted to the Host (computer) was apparently interrupted by the start of a message from the Host	• Information only
63	A call to transmit ( ) was deferred due to it not being okay to transmit	• Information only
64	We tried to send a sync packet	• Information only
65	An attempt to send a sync packet failed	• Information only
67	An incubator communications error resulted in us calling the inc_sync ( ) routine	• Information only
68	A bar code was unreadable	• Will generate a **Bad Bar Code** error (BCERR) • Check condition of bar code being read • Check bar code reader alignment (see Alignments — Scanner Alignment)
69	A bar code did not read on the first try. This is set when it starts the retry phase, and will be set once per strip that it retries, regardless of how many retries are done.	• Information only

SCANNER CODES	DESCRIPTION	ACTION
70	A **CV** for a reading was over limit	• Check for electrically noisy Scanhead (ferrite bead installed) • Verify Optics Calibration (see Maintenance — Optics Calibration
71	Scheduling slop error. A contig J-reading was seen by the checkinc ( ) loop. Should not have been. Would have secfailed if not a contig reading.	• Information only
72 73	Scheduling slop error	• Information only
74	A temperature error occurred in one of the Sections	• Check Temperatures
75	The motor fix task was called	• Check for error 76. If 75 = 76 (number of errors equal) Scanner Motor OK
76	Motor fix task did not find a problem with the motor	• Check for error 75. If 75 > 76 (number of errors not equal) check Scanner Motor

☞ **NOTE**: Scanner Codes above 100 are ERRORS and will appear on the operator's screen. These codes can also be seen with a Diagnostic Terminal. The cause of these errors should be corrected.

SCANNER CODES	DESCRIPTION	ACTION
101	Receive failed due to lack of memory	• Allow current assay (s) to finish, then cycle power to the mini VIDAS • Replace Scanner Board
102	Command **PROTO** failed due to memory full	• Allow current assay (s) to finish, then cycle power to the mini VIDAS • If development system, check number and size of protocols - may have too many • Replace Scanner Board
103	Unknown command received from Host (VIC)	• If error occurred while entering a command on keypad, try entering the command again • Possible corrupt software on VIC Board • Possible defective Scanner Board
104	Command **VIDASEP** parameters were invalid	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible

SCANNER CODES	DESCRIPTION	ACTION
105	Command **STINC** (Start Section) parameters were invalid	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible
106	Command **RETRAN** (Retransmit) parameters were invalid	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible
107	Command **RSINC** (Reset) parameters were invalid	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible
108	Command **PROTO** (Protocol) parameters were invalid	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible
109	Incubator did not respond to the reset command (Section Reset Error)	• Use **rsinc x** (**x** = the Section letter) on the Diagnostic Terminal to reset the Section or reset by selecting **Halt Section** from the **Utility Menu** • Verify Address/Reset jumpers and voltages on the Incubator Board (see Appendix D) • Check ribbon cable from the Scanner Board to the Incubator Board • Replace the Incubator Board • Replace the Scanner Board
110	An Incubator whose start time had been reached failed to start (Section Start Error)	• Verify Address/Reset jumpers and voltages on the Incubator Board (see Appendix D) • Replace the Incubator Board • Replace the Scanner Board
111	Incubator re-start after a tray read failed (Section Restart Error)	• Verify Address/Reset jumpers and voltages on the Incubator Board (see Appendix D) • Replace the Incubator Board • Replace the Scanner Board
112	Command **STINC** failed while attempting to download the protocol to the Incubator (Protocol Error)	• Use **rsinc x** (**x** = the Section letter) on the Diagnostic Terminal to reset the Section or reset by selecting **Halt Section** from the **Utility Menu** • Rerun the Assay • Replace the Incubator Board
114	Incubator error occurred while an assay was/is in progress (Section Failure - an Incubator error should have preceded this error.)	• Check for error 136, correct as required • Verify all voltages on the Incubator Board • Use **dink x 64** (**x** = Section letter) on Diagnostic Terminal to look for motor errors - check/repair if errors found • Perform **burn-in** from **Service Menu** (**7378**) • Replace the Incubator Board

SCANNER CODES	DESCRIPTION	ACTION
115	Command **BCREAD** parameters were invalid. (Invalid Bar Code parameters)	• Use the Diagnostic Terminal to perform **bc_x** (**x** = Section letter) for the affected Incubator • Verify Bar Code Reader Alignment (see Alignments — Scanner Alignment)
117	A stored Protocol is corrupt.	• Cycle power to the mini VIDAS
119	Command **RESET** parameters were invalid. (Invalid Section Reset parameters)	• Will also have VIC error 2038 • Cycle power to the mini VIDAS . • Verify Software and Firmware are compatible
120	Command **INTERP** (Interpret) parameters were invalid. (Illegal Interpret parameters)	• Cycle power to the mini VIDAS • Verify Software and Firmware are compatible
121	A **READBC** command could not be done due to the current instrument status. (Unable to perform a Bar Code read)	• Will also have VIC error 2039 • Verify SPR Door Sensor Alignment and operation (usually cause by an open door) • Check quality of reflective surface on SPR Door. (New heater pad cover installed?) • Check instrument status (use the **stat** command on the Diagnostic Terminal) • Check the **checkinc** status line on the Diagnostic Terminal
122	A **STINC** command could not be done due to the current instrument status. (Scanner unable to start a Section)	• See action for Code 121
123	A **RETRAN** command could not be done due to current instrument status. (Scanner Board unable to retransmit data.)	• Check ribbon cable between the VIC Board and the Scanner Board • Replace the Scanner Board • Replace the VIC Board
124	Optics self-test failed. Air reading too high (Air reading $\geq$ 20)	• Clean Optics • Verify Optics Calibration (see Alignments — Optics Calibration) • Check for noisy Scanhead (Spreads, **CV**, etc.) • Replace Scanner/Carriage Assy • Replace the Scanner Board

SCANNER CODES	DESCRIPTION	ACTION
125	Optics self-test failed. (Extended range hardware failure)	• Use **EXTR** command (on Diagnostic Terminal) to verify **BR** average minus **SR** average is less than 50 counts • Verify Optics Calibration - especially final zero and mV adjustments (see Alignments — Optics Calibration) • Replace the Scanner Board
126	Optics self-test failed. Air readings have climbed to a level at which Field Service should be notified. (Air readings $\geq$ 10)	• Clean Optics • Verify Optics Calibration (see Alignments — Optics Calibration) • Replace the Scanner Board • Replace the Scanner/Carriage Assy.
127	Optics self-test failed.	• See action for Code 126
128 129 130 131	Computer self-test failed.	• Replace the Scanner Board • Notify bioMérieux Engineering of instrument status at time of failure
132	Command **SLIPTIME** parameters were invalid. (Protocol Read Scheduling Error)	• Replace Firmware on the Scanner Board • Replace the Scanner Board • Replace the Incubator Board • Notify bioMérieux Engineering — return defective part to Engineering's attention. • Notify bioMérieux Engineering of instrument status at time of failure
133	Started looking for a **Jx** status too late. (Protocol Read Scheduling Error - time glitch)	• See action for Code 132
134	Section status while in fastpoll loop was not the correct **Jx**, nor was it a **WORKING** status. (Protocol Read Scheduling Error - Section status)	• Perform **dinc x** (**x** = Section letter) command on the Diagnostic Terminal, and check for any Section problems. (Correct any problems found.) • See action for Code 132
135	Timed out in fastpoll routine while waiting for the **Jx** status. (Protocol Read Scheduling Error)	• See action for Code 134 • See action for Code 132

SCANNER CODES	DESCRIPTION	ACTION
136	A tray scan failed. (Scanhead unable to find tray edge.)	• Usually caused by Scanhead movement problem • Perform an **errs** command on the Diagnostic Terminal to check for errors (see Codes 30 thru 32)
137	A **Jx** status was detected by the **checkinc**( ) loop on a non-contig scheduled mode J-reading. (Protocol Read Error)	• Perform an **errs** command on the Diagnostic Terminal to check for errors
138	The parameters in the **SECTEMP** command were invalid.	• Use **rsinc x** (**x** = the Section letter) on the Diagnostic Terminal to reset the Section or reset by selecting **Halt Section** from the **Utility Menu** • Rerun the assay • Check Firmware version • Replace the Incubator Board
139	Used in a **secfail** message, this indicates that the Section aborted due to a manual reset command from the VIC (computer).	• Operator induced • Instruct Operator not to reset Sections that are running
141	A bad state when we went to scan the tray. Section state is not **RUNNING**.	• Perform **dinc x** (**x** = Section letter) command on the Diagnostic Terminal, and check for any Section problems. (Correct any problems found.) • Try duplicating problem by running **burn-in** (**Service Menu — 7378**) while watching for errors on Diagnostic Terminal • Replace the Incubator Board
142	A **bad** stat when we went to scan the tray. *This is not the same as the previous error code!!*	• See action for Code 141

SCANNER CODES	DESCRIPTION	ACTION
143	Unable to home the scanhead	• Check the Scanner/Carriage Assy. for mechanical binding • Check for loose cables or wires interfering with Scanhead movement (such as bar code cable) • Verify Scanner Home sensor operation and adjustment (see Alignments — Scanner Alignment). Replace if bad. • Verify scanner motor operation by typing the command **checkmotor** and pressing **ENTER** on the Diagnostic Terminal, and watch for step errors. • Check +10 VDC Power Supply voltage. • Replace Scanner motor • Replace Scanner Board
144	Checking the home position failed in the self-test	• See action for Code 143
145	The motor speed has fallen to a level at which Field Service should be notified	• See action for Code 143
146	Instrument memory almost full. (Scanner memory capacity **warning**)	• Check instrument status using the **stat** command on the Diagnostic Terminal, and notify bioMérieux Engineering . • Replace the Scanner Board.
147	Extended range optics failure	• Replace the Scanner Board.
148	The internal stack usage has reached a level to be concerned about	• Check instrument status using the **stat** command on the Diagnostic Terminal, and note the **Istack** information (Istack = 600). Notify bioMérieux Engineering if istack exceeds 600 • Replace the Scanner Board.
149	The external stack usage has reached a level to be concerned about	• Check instrument status using the **stat** command on the Diagnostic Terminal, and note the **Xstack** information (Normal Xstack = 1500). Notify bioMérieux Engineering if Xstack exceeds 1500. • Replace the Scanner Board.
150	More errors have occurred than would fit in the error queue. Some have been lost.	• Perform an **errs** command on the Diagnostic Terminal to check for errors. • Correct cause of other errors
151	Command **DELPROTO** parameters were invalid	• Cycle power to the mini VIDAS.
152	Command **SETVAR** parameters were invalid	• Cycle power to the mini VIDAS.
153	Command **BCTEXT** parameters were invalid	• Cycle power to the mini VIDAS.

SCANNER CODES	DESCRIPTION	ACTION
154	A **BCTEXT** command could not be done due to the current instrument status	• Check instrument status using the **stat** command on the Diagnostic Terminal • Cycle power to the mini VIDAS
155 156	The non-volatile RAM checksum failed (Memory corrupted or checksum value not established during calibration of Scanner Board)	• Recalibrate optics to establish the checksum value. (See Alignments — Optics Calibration) • Replace the Scanner Board
157	Auto-calibration data not present in non-volatile RAM, but a Solid Standard Bracket was found in the instrument. (The Scanner found a Solid Reference Standard Bracket installed in the instrument, but didn't find any stored calibration data.)	• Recalibrate optics and be sure to perform the **store-std** command to store calibration data. (See Alignments — Optics Calibration) • Replace the Scanner Board
158	Auto-calibration data present in non-volatile RAM, but Solid Standard Bracket not found	• Verify Solid Reference Standard is installed. If not, type **center-dp** and press **ENTER** on the Diagnostic Terminal, to clear stored data and recheck optics calibration • Install Solid Reference Standard and recalibrate optics • If Standard is installed, verify operation of the Scanhead tray edge sensor on the Solid Standard Bracket
159	Solid Standard Bracket can no longer be found	• See action for Code 158
160	Calibration Drift is excessive. (Calibration has changed more than 3% since last check)	• Cycle power to the mini VIDAS • Recalibrate the Optics • Replace the Scanner/Carriage Assy • Replace the Scanner Board • Replace the Solid Reference Standard
161	Digit-pot too close to the end of its range. (Error will occur when less than 10% of digipot range is available and will lock out when digipot reaches less than 3% of range.) Notify Field Service to check Optics Calibration.	• Check Solid Standard Bracket spacing (see Alignments — Scanner Alignment) • Recalibrate the Optics • Replace the Scanner/Carriage Assy • Replace the Scanner Board • Replace the Solid Reference Standard
162	Auto-calibration not performed recently. (Instrument too busy to perform calibration)	• Allow the mini VIDAS to set idle for awhile (>1 hour) • Cycle power to the mini VIDAS

Chapter Seven D: **Section Codes**

The status and state of each Section (Incubator) is sent from the Incubator Board to the VIC Board (computer) through the Scanner Board as part of the VIDASEP message. These codes pass through the Scanner Board unchanged, except in the case when the status code includes an error and the Section is considered to be **"hardware failed"**. The VIC Board adds "**1000**" to the error code so that you can differentiate between Section errors and Scanner errors.

A Section Error displays when a mechanical or electrical error occurs within **an individual section**. The operation of the remaining section will not be affected; therefore troubleshooting for a Section Error should be concentrated on that Section only. The Section Error Code (ERR1001 - ERR1099) will display on the mini VIDAS operator's screen.

Example: Error 18 (Door was opened while assay in progress) would be reported by the computer and displayed as error 1018.

The Section (Incubator) state code indicates what a Section is currently doing. The Scanner Board monitors the state of the Section through the VIDASEP message. **The Incubator state code is informational only, and is not an error code.**

The Incubator status and state codes will also display on the Diagnostic Terminal as the first and second member respectively of the "**Checkinc:**" message as shown below.

18 Checkinc: A 11 0 B 9 0 C 99 9 D 99 9 E 99 9

Where 11 is the status (temperature error) and 0 is the state (idle) of Section A.

NOTE: Use Cable, P/N 527807-1, to connect a Diagnostic Terminal to J7 on the Scanner Board.

To view Section status and errors on a Diagnostic Terminal, type **dincs**. This command will scroll through all Incubators (Sections). To view an individual Section, on the Diagnostic Terminal, type **dinc x** (where **x** = Section Letter).

Complete listings of Section (Incubator) Status (Error) and State Codes, for the mini VIDAS follow.

Incubator Status Codes (Errors)

A complete listing of Incubator codes as they appear in the **checkinc:** message, along with suggested corrective action follows. These codes will appear on the operator's screen as a 1000 number (e.g. 1011 Temperature Error).

INCUBATOR CODES	MESSAGE / SYMPTOM	ACTION
1000	Assay Read 0	• Scanhead Read J0
1001	Assay Read 1	• Scanhead Read J1
1002	Assay Read 2	• Scanhead Read J2
1003	Assay Read 3	• Scanhead Read J3
1004	Assay Read 4	• Scanhead Read J4
1005	Incubator Working	• Section is running
1006	Incubator Resetting	• Section is resetting.
1007	Incubator waiting to be unloaded	• Assay completed. Open SPR Door and remove SPRs
1008	Protocol Error	• Will generate a Scanner Error
1009	Incubator Idle	• Section is ready to run assay
1010	Door open	• Close Section SPR Door • If closed, check door sensor and heater cover pad (reflective surface)
1011	Temperature Error	• Verify Temperatures
1012	Didn't see Tower sensor transition (Tower Jam or Sensor Failure)	• Run Assay code **TP5** (Manufacturing Menu — **6263** — Express start) and observe the **Tower** LED on the Incubator Board to verify sensor operation • Verify Tower Sensor Alignment. (See Alignments — Section Alignment) • Check for mechanical movement problems • Tower motor problem, replace as required
1013	Didn't see Tray sensor transition (Tray Jam or Sensor Failure)	• Run Assay code **TP6** (Manufacturing Menu — **6263** — Express Start) and observe the **Tray** LED on the Incubator Board to verify sensor operation • Verify Tray Sensor Alignment (See Alignments — Section Alignment) • Check for mechanical movement problems • Check for sticking SPR liner • Tray motor problem, replace as required
1014	Didn't see pump sensor transition [Pipettor (pump) Jam or Sensor Failure]	• Run Assay code **TP4** (Manufacturing Menu — **6263** — Express Start) and observe the **Pump** LED on the Incubator Board to verify sensor operation • Verify Pump Sensor Alignment (See Alignments — Section Alignment) • Check for mechanical movement problems • Pump motor problem, replace as required

INCUBATOR CODES	MESSAGE / SYMPTOM	ACTION
1015	Found sensor, motor lost steps (Tower positioning Error)	• Type **dink x 64** (**x** = Section letter), at the Diagnostic Terminal, to see if motor lost steps • Run Tower Test Diagnostics (see Section Diagnostics), or **burn-in** (Field Service Menu — **7378**) • Check timing belt • Check for mechanical movement problem
1016	Found sensor, motor lost steps (Tray Positioning Error)	• Type **dink x 64** (**x** = Section letter), at the Diagnostic Terminal, to see if motor lost steps. • Run Tray Test Diagnostics (see Section Diagnostics), or **burn-in** (Field Service Menu — **7378**) • Check Tray drive gears for damaged teeth, replace Tray Pivot Plate Assembly or gear as required. • Check for loose gear on Tray drive motor. • Check for mechanical movement problems.
1017	Found sensor, motor lost steps (Pipette Positioning Error)	• Type **dink x 64 (x** = Section letter), at the Diagnostic Terminal, to see if motor lost steps • Run Pump Test Diagnostics (see Section Diagnostics), or **burn-in** (Field Service Menu — **7378**) • Replace pump motor as required • Replace pump assembly
1018	Door was opened while assay was in progress	• Will also generate a Scanner Error. • Check door sensor • Check for new heater pad cover
1050 1051	Tray temperature too high/low (Normal mini VIDAS cold start error)	• Verify Tray temperature (37°C ± 1.7°C) • Defective Tray Heater pad replace Tray assembly • Defective Incubator Board
1052 1053	SPR temperature too high/low (Normal mini VIDAS cold start error)	• Verify SPR Block temperature (37°C ± 1.5°C) • Defective SPR Block Heater Pad, replace SPR Block assembly • Defective Incubator Board
1054 1055	Tray temperature higher/lower than tray average limit	• Verify Tray temperature average (37°C ± 1.7°C; ± 0.7°C matching Tray-to-Tray) • Defective Tray assembly • Defective Incubator Board
1056 1057	SPR temperature higher/lower than average limit	• Verify SPR Block temperature average (37°C ± 1.5°C; ± 0.5°C matching Block-to-Block) • Defective SPR Block assembly • Defective Incubator Board

INCUBATOR CODES	MESSAGE / SYMPTOM	ACTION
1058	Can't read temperatures	• Verify correct / compatible version(s) of Firmware is installed in both the Incubator and Scanner Boards • Defective Incubator Board
1059	Temperature reference on Incubator Board invalid.	• Verify 28 VAC power supply voltage • Replace Incubator Board
1090	Too many Incubator errors, some errors dropped.	• Correct cause of other errors
1091	Scanner couldn't find edge of tray (Section tray origin failure)	• Clean back edge of tray and type **tfx** (**x** = Section letter), on the Diagnostic Terminal, to see if the Scanhead can find tray edge. • Verify Tray Alignments (see Internal Installations and Alignments — Section Alignment). • Verify Scanner Tray Edge Sensor Alignment (see Alignments —Scanner Alignment). • Check for defective sensor or ribbon cable on Scanhead.
1097	Unable to contact Incubator upon hardware reset	• Use **rsinc x** (**x** = the Section letter) on the Diagnostic Terminal to reset the Section or reset by selecting **Halt Section** from the **Utility Menu** • Verify Incubator cable connections, jumpers, and voltages • Replace the Incubator Board • Replace the Scanner Board
1098 1099	Incubator communication error	• Use **rsinc x** (**x** = the Section letter) on the Diagnostic Terminal to reset the Section or reset by selecting **Halt Section** from the **Utility Menu** • Verify Incubator cable connections, jumpers, and voltages • Replace the Incubator Board. • Replace the Scanner Board.

Incubator State Codes (Information)

☞ **NOTE**: The Incubator state code is intended for informational purposes only and is not an error code. Do not rely on these codes alone to determine if something has failed.

A complete listing of Incubator States (second part of the "**Checkinc:**" message) follows.

INCUBATOR STATE	DESCRIPTION
0	The Section is available for an assay to be scheduled into it (idle).
1	An assay has been scheduled, but the Section has not yet been started.
2	An assay is in progress.
3	The assay has completed, and we are in the process of making sure that the Scanner hardware maintained its integrity.
4	An assay has completed. Will return to the available state once the **FLINFO** (readings) has been sent, and the Incubator status goes to idle.
5	Scanning the tray.
6	A bar code read is in progress.
7	A reset command has been sent to the Incubator Board, and waiting for it to complete.
8	There has been a fatal error.
9	The Incubator would not reset, even when the hardware reset line was used.
10	The assay has completed, and the **FLINFO** data has been sent to the VIC Board (Computer). Will return to available when the door is opened and closed again.
11	The tray origin is not set yet. Getting it.
12	The Section has been sent a **STINC** (start inc) command, but has not yet been scheduled to run.

Chapter Seven E: **Menu Fastcodes**

Menu fastcodes provide a quick access to various screens or menus that can be used while troubleshooting the mini VIDAS. Enter a menu fastcode at any ***menu*** screen by pressing the digits, on the keypad, one after the other (no visual indication) followed by the ↵ key. A listing of the Menu fastcodes follows.

CODE	MENU / SCREEN	DESCRIPTION
1	Set Display contrast	Display Contrast Adjustment Screen appears — set screen display to acceptable level.
2	Display Version	Show Version Screen appears — displays software, firmware and protocol versions installed.
3	Card Info	Provides quick access to the Service Menu selection to display the version of memory card information. Memory card must be inserted in the memory card slot on rear of the instrument.
6	Section Status Screen	Section Status Screen appears — display status of both Sections and provides access to temperature display screen.
9	Printer Form Feed	Performs form feed on printer. May be used to feed paper after tearing off reports to prevent paper from dropping under the paper lid over time and causing jams.
13	Program Update Function	Program Update Screen appears — follow on-screen instructions to update software.
33	Load BAP Card	Load BAP Card Screen appears — select Section in which the card has been placed and update begins.
123	Select Language	Select Language Screen appears — select appropriate language.
384	Enable Pass-through Mode	Converts the mini VIDAS into a two-section VIDAS instrument, that must be connected to a Nerve Center computer via the LIS (Diagnostic) port (software version R2.12 & up).
1843	Spill Section Data to Printer	Normally used to diagnose software problems. Sends a large amount of data to printer. **USE ONLY WHEN DIRECTED BY BIOMÉRIEUX ENGINEERING**.
2837	Assay / Protocol Version	Prints Assay list with short name, protocol, and version
3278	Express (Start) Assays	Provides quick access to the Express Start assays (QCT; OPT; TPs) of the Manufacturing Menu. These assays may be used in troubleshooting, and are instantly started in all sections.
3366	Demo Menu	Demo Function Screen appears — Hidden Menu containing functions used at trade shows etc. to demonstrate instrument operation.
6263	Manufacturing Menu	Provides quick access to Test Menu and other menus normally used in production and final test.
6676	Normalize	Sets display contrast to a nominal value and displays the Language Selection Menu. **MUST BE AT A MENU FOR CODE TO WORK**.

CODE	MENU / SCREEN	DESCRIPTION
6853	Clean Slate	**ERASES ALL** internal Flash Memory and clears configuration data from the NVRAM. Does not format the internal drives, simply clears them.
7378	Service Menu	Field Service Function Screen appears — Hidden Menu provides access to data backup / restore, burn-in, and other programs.

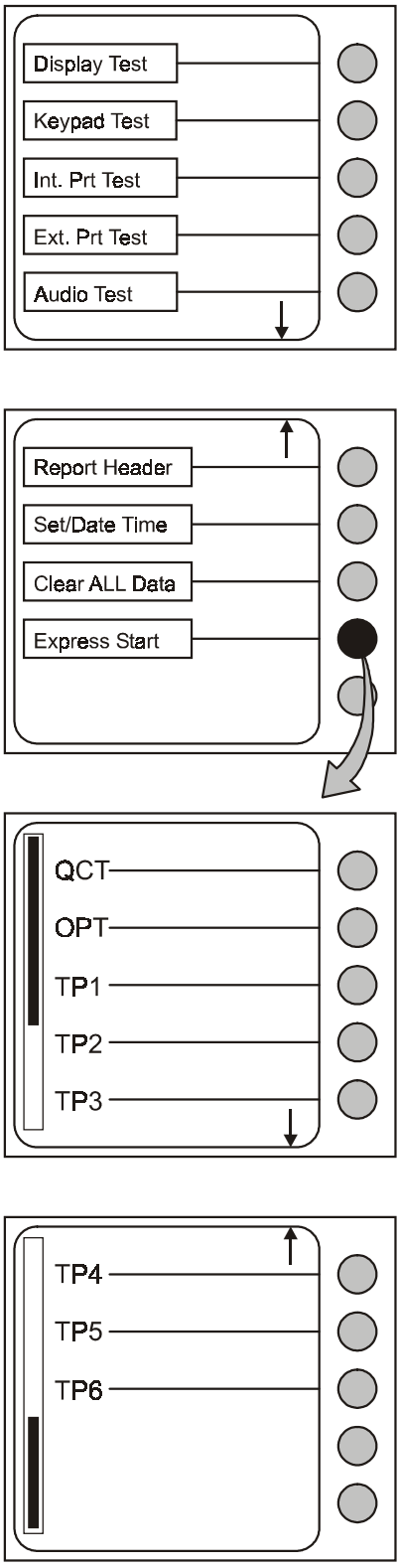


Figure 7-12 Manufacturing Menu

Troubleshooting Protocols

There are eight test protocols available in mini VIDAS software for troubleshooting purposes. These protocols are accessible through the Express (Start) Assays Menu and are helpful in troubleshooting the instrument. To access the Express (Start) Assays Menu, enter **3278** and press the ↵ key on the keypad. This menu also appears when you select **Express Start** on the Manufacturing Menu (see Figure 7-12).

A description of the Test Protocols follows.

TEST CODE	TEST TYPE	DESCRIPTION
QCT	Quality Control Test	Comprehensive test of the pipetting mechanism and optical system.
OPT	Optics/Substrate Test	Performs one reading of the cuvette.
TP1	Read Test	Performs two reads of the substrate in the cuvette. Allows time to move strips after first read to next tray.
TP2	Tray Punch Test	Verifies that the SPRs punch every well and demonstrates how accurately they puncture the wells.
TP3	Leak Test	Checks the SPR Seal Interface. Verifies the SPR can pick up a specified volume of fluid and hold it for a period of time.

☞ **NOTE**: Reagent strips and SPRs must be in place before running QCT, Tray Punch Test (TP2) and Leak Test (TP3).

TP4	Pipette Test	Checks the mechanics of the pipetting device within the instrument.
TP5	Tower Test	Checks tower movement to verify the tower is functioning properly. Normally, run this test after clearing a tower jam.
TP6	Tray Test	Checks tray movement to verify the tray is functioning properly. Normally, run this test after clearing a tray jam

Test Menu

The Test Menu is helpful in troubleshooting problems with the LCD display, keypad printer and audio alarm system. The Test Menu is the first screen of the Manufacturing Menu, and can be accessed by entering **6263** followed by the ↵ key on the keypad (see Figure 7-12). The operator can also access a similar test menu through the Misc. Functions Menu. The difference in the two test menus is the printer test. A description of the individual tests follows.

TEST	DESCRIPTION
Display Test	Darkens the screen to show defective pixels.
Keypad Test	Displays each button on the keypad as it is pressed (see Figure 7-13). Press the ↵ key last. The screen displays **keypad okay** if successful.
Int. Prt Test	Prints out a test pattern on the internal printer (see Figure 7-14).
Ext. Prt Test	Prints out the test pattern on the external printer, if selected.
Audio Test	Sounds the alarm beep.

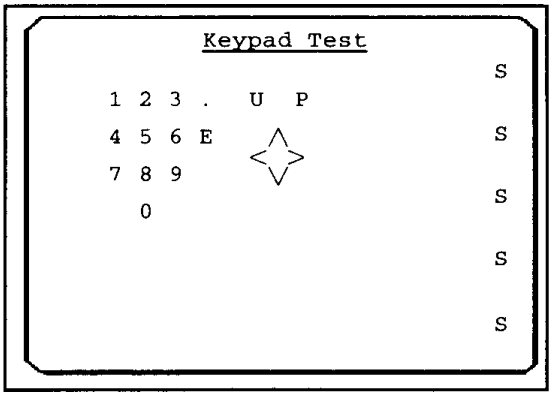


Figure 7-13 Keypad Test Display

Figure 7-14 Printer Test Printout

Service Menus

The Service Menus provide quick access to backup and other internal data handling capabilities. The menu also provides a method to test the operation of the mini VIDAS without running an assay. The Service Menu consists of two screens, and is accessed by entering **7378** followed by the ↵ key on the keypad (see Figure 7-15). A description of the Service Menu follows.

SELECTION	DESCRIPTION
Backup ALL idata	Performs a backup of ALL instrument data onto a 256K flash memory card (P/N 169032-256) installed in the memory card slot, on the rear of the mini VIDAS.
Restore ALL idata	Restores ALL instrument data from a backup. Be sure to reboot after performing a restore.
Clear ALL idata	Clears ALL instrument data — Configuration options, Master Lot Data, Standards, etc. (See Operator's Manual for additional information.)
Clear Configuration data	Clears Configuration data (Dose Units, Tech. ID, Report Header, etc.)
Delete all standards	Deletes all standard information.
Burn-in	Runs a burn-in protocol that tests all motors in the instrument.
Clone Program	Copies the Software (VIDVIC).
Card Info	Identifies the card in the Memory Card Slot and displays information on the screen.
Update Program	Perform software update of Program.
Update Assays	Perform Assay Protocol (PTC) update
About...	Displays general "about" software on the screen.

The backup feature provided in this menu is useful when replacing a VIC Board. Instrument data can be backed up to a flash card, provided the old board responds to keypad entries, and restored to the new VIC Board, saving the time required to manually restore this data.

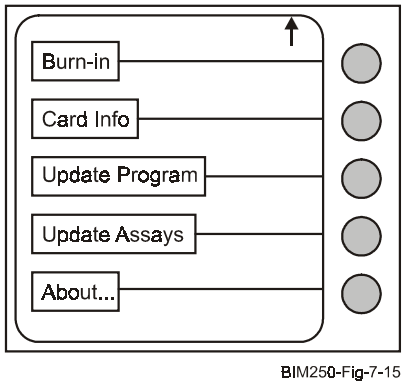


Figure 7-15 Service Menu

Chapter Seven F: **Diagnostics**

Diagnostics consist of Commands and Tests that can be of assistance when troubleshooting the mini VIDAS.

Diagnostic Commands

Following is a list of some of the commands that are used during alignment and troubleshooting. The commands are entered from a Diagnostic Terminal (laptop).

COMMAND	DESCRIPTION
bc_x (x = section letter)	Performs a bar code read of strips in the selected section.
burnin	Runs burn-in protocol which tests all motors in the mini VIDAS. Can be performed from Service Menu (7378) or diagnostic terminal.
cal	Forces an Auto Calibration of the optic system.
center-dp	Clears stored optics calibration data
checkmotor	Runs scanner motor test.
dincs	Status of all sections will scroll on screen.
dinc x (x = section letter)	Status of the selected section will appear on screen with motor checksum and home error totals.
dink x 64 (x = section letter)	Status of the selected section will appear on screen with motor missing step information.
errs	Displays Scanner errors on Diagnostic Terminal screen.
event sanity	Runs scanhead checks performed during initialization cycle.
moff	Removes power from the scanner drive motor to allow manual movement of the Scanhead.
o	Turns on the lamp in the Scanhead — flashes continuously
op	Flashes lamp once then displays reading — does this continuously
park	Parks the Scanhead, trays and tower assemblies for shipping. Can be performed from the **Misc. Functions Menu** or diagnostic terminal.
r	Performs 1 read cycle of the Scanhead and displays the raw result

rr	Performs 1 read cycle of the Scanhead and displays the average and raw results.
rsinc x (x = section letter)	Reset a section from the diagnostic terminal.
rsincs	Reset all sections
stat	Displays instrument status on screen of diagnostic terminal.
store-std	Performs optics calibration, use this command in conjunction with the center-dp command.
temp	Displays Tray and SPR temperature A/D output from Incubator Board for all Sections on screen of diagnostic terminal.
tfx (x = section letter)	Tray Find — tray pulls in and scanhead finds tray edge.

Diagnostics Tests

The Diagnostic Tests can be of assistance when troubleshooting a mini VIDAS. It is possible to perform Diagnostic Tests on the Scanner or any individual Section. Entering test commands to run the tests on the Diagnostic Terminal (Laptop) keyboard can aid in troubleshooting, verification of alignments, preventive maintenance, or repair of the mini VIDAS.

WARNING! **POTENTIAL BIOHAZARDOUS MATERIAL** — Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

Scanner Test

NOTE: There are many STATIC sensitive components in the mini VIDAS. The Scanner Board is particularly sensitive, use extreme care! Use proper anti-static precautions when working on the instrument.

The Scanner Test command will exercise the Scanner/Carriage Assembly. To perform the Scanner Test proceed as follows:

1. Connect a Laptop (diagnostic terminal) to J7, on the Scanner Board.

2. Apply power to the mini VIDAS, if not already ON, and allow it to reset completely. This is accomplished when you see the follow message on the screen:

   18 Checkinc: A 9 0 B 9 0 C 99 9 D 99 9 E 99 9

3. Type **shell** and press **ENTER**. The terminal will respond with a **:** prompt (skip this step if you are already at the **:** prompt).

4. At the **:** prompt, type **checkmotor** and press **ENTER** to start the Scanner test. If the test fails, check for binding or verify alignments.

5. To stop or restart the test, press the **Spacebar**.

Section Diagnostics

To check the operation of the Pump, Tower, or Tray motor, in a Section, for missing steps, use the appropriate Section Diagnostic command. A report of motor operation will display on the Diagnostic Terminal, for each cycle as the test is running. Always run a test for a minimum of 10 cycles to determine operational acceptability. To perform the Section Diagnostics the shell prompt, **:** , must be displayed on the Diagnostic Terminal; if not refer to Scanner Test for setup information (steps 1 - 3).

Tray Test

The Tray Test command will exercise the tray. When **motor tray** is selected and the command **ttest** is performed, the tray will pull in, move slightly out, pull back in, move 20 steps out and then repeat the sequence. To perform the Tray Diagnostic Test proceed as follows:

1. Disconnect the power connector to the Incubator Board of the Section you are going to align.

2. Place the **RUN-TEST** Switch (**SW1**) to the **TEST** position on the Incubator Board for the section being aligned. Reconnect power to the board.

3. Verify the shell prompt, **:** , is displayed on the Diagnostic Terminal. If not see Diagnostic Tests — Scanner Test.

4. At the **:** prompt on the terminal, type **echo** and press **ENTER**. The terminal will respond with **QUIET OFF** and display a letter prompt **[A, or B]** for the section being tested. **Verify that the letter in the brackets, [x], on the screen, matches the section being tested (x = section letter).**

☞ **NOTE**: Before proceeding, type **mac** and press **ENTER**. If percentage used exceeds 90%, type **clearmac** and press **ENTER,** then continue with step 5.

5. At the letter prompt, **[x]**, type **motor tray** and press **ENTER**.

6. At the prompt, **[x]**, type:

   setmac ttest home loop k { out 71 in 66 loop 20 { out 33 wait 2 } ch } and press **ENTER**.

7. At the prompt, **[x]**, type **ttest** and press **ENTER** to start the tray test and report step errors.

8. Error ranges are as follows:

   - Acceptable = 1
   - Marginal = 2
   - Failure = 3 or greater

9. To stop or restart the test, press **ENTER**.

10. If no other tests are to be performed, see Section Diagnostics — Section Completion.

Pump Test

The Pump Test command will exercise the Pump Assembly. Open the **SPR door and manually lower the Tower Assembly**, to observe the pump action before performing this test. When **motor pump** is selected and the command **ptest** is performed the Pump Assembly will only be simulating pipetting action. The ball bearings on the top of the pump pistons will ascend and then descend repeatedly. To perform the Pump Diagnostic Test proceed as follows:

1. Disconnect the power connector to the Incubator Board of the Section you are going to test.

2. Place the **RUN-TEST** Switch (**SW1**) to the **TEST** position on the Incubator Board for the section being tested. Reconnect power to the board.

3. Verify the shell prompt, **:** , is displayed on the Diagnostic Terminal. If not, see Diagnostic Tests — Scanner Test.

4. At the **:** prompt on the terminal, type **echo** and press **ENTER**. The terminal will respond with **QUIET OFF** and display a letter prompt **[A, or B]** for the section being tested. **Verify that the letter in the brackets, [x], on the screen matches the section being tested.**

☞ **NOTE**: Before proceeding, type **mac** and press **ENTER**. If percentage used exceeds 90%, type **clearmac** and press **ENTER,** then continue with step 5.

5. At the prompt, **[x]**, type **motor pump** and press **ENTER**.

6. At the prompt, **[x]**, type **speed 3** and press **ENTER**.

7. At the prompt, **[x]**, type:

   setmac ptest home loop k { out 320 loop 34 { in 20 wait 2 } ch }
   and press **ENTER.**

8. At the prompt, **[x]**, type **ptest** and press **ENTER** to start the pump test and report step errors .

9. Error ranges are as follows:

   - Acceptable = 1
   - Marginal = 2
   - Failure = 3 or greater

10. To stop or restart the test, press **ENTER**.

11. If no other tests are to be performed, see Section Diagnostics — Section Completion.

Tower Test

The Tower Test command will exercise the Tower Assembly. When **motor spr** is selected and the command **stest** is performed, the Tower Assembly will travel down and simulate tower movement action. **Close the SPR door** before performing this test. To perform the SPR Test proceed as follows:

1. Disconnect the power connector to the Incubator Board of the Section you are going to test.

2. Place the **RUN-TEST** Switch (**SW1**) to the **TEST** position on the Incubator Board for the section being tested. Reconnect power to the board.

3. Verify the shell prompt, **:** , is displayed on the Diagnostic Terminal. If not, see Diagnostic Tests — Scanner Test.

4. At the **:** prompt on the terminal, type **echo** and press **ENTER**. The terminal will respond with **QUIET OFF** and display a letter prompt **[A, or B]** for the section being tested. **Verify that the letter in the brackets, [x], on the screen matches the section being tested.**

NOTE: Before proceeding, type **mac** and press **ENTER**. If percentage used exceeds 90%, type **clearmac** and press **ENTER,** then continue with step 5.

5. At the letter prompt, **[x]**, type **motor spr** and press **ENTER**.

6. At the prompt, **[x]**, type **speed 1** and press **ENTER**.

7. At the prompt, **[x]**, type:

   setmac stest home loop k { in 3250 loop 23 { out 250 wait 2 } ch }
   and press **ENTER**.

8. At the prompt, **[x]**, type **stest** and press **ENTER** to start the tower test and report step errors. The error ranges are as follows:

   - Acceptable = 5
   - Marginal = 6 to 8
   - Failure = 9 or greater

9. To stop or restart the test, press **ENTER**.

10. If no other tests are to be performed, see Section Diagnostics — Section Completion.

Tower Preventive Maintenance

Use the Tower Preventive Maintenance command, when cleaning and lubricating the two tower drive screws. Its sole intent is to run the Tower Assembly up and down with the **SPR DOOR OPEN.**

Connect the Diagnostic Terminal to J7 on the Scanner Board and the shell prompt, **:** , will be displayed on the terminal. To perform the Tower Preventive Maintenance command, proceed as follows:

1. Remove the LED trim panel to gain access to the tower drive screws. Take care while cleaning or lubricating the drive screws to avoid personal injury.

2. Disconnect the power connector to the Incubator Board of the Section on which you are going to perform preventive maintenance.

3. Place the **RUN-TEST** Switch (**SW1**) to the **TEST** position on the Incubator Board for the section being tested. Reconnect power to the board.

4. Verify the shell prompt, **:** , is displayed on the Diagnostic Terminal. If not see Diagnostic Tests — Scanner Test.

5. At the **:** prompt on the terminal, type **echo** and press **ENTER**. The terminal will respond with **QUIET OFF** and display a letter prompt **[A, or B]** for the section being tested. **Verify that the letter in the brackets, [x], on the screen matches the section being tested**.

6. At the letter prompt, **[x]**, type **motor spr** and press **ENTER**. Then type **out 6300** and press **ENTER**. The Tower will drive down.

NOTE: Be sure to observe the pump sensor wires for adequate slack, as the tower drives down. If the sensor wires have insufficient slack, damage to the sensor can occur.

7. At the letter prompt, **[x]**, type **in 6300** and press **ENTER**. The Tower will drive up.

8. If no other tests are to be performed, see Section Diagnostics — Section Completion.

Section Completion

1. Press **Ctrl X**. The shell prompt, **:** , should return to the screen.

2. Disconnect the power connector to the Incubator Board of the Section you just finished servicing.

3. Place the **RUN-TEST** Switch (**SW1**) to the **RUN** position on the Incubator board.

4. Reconnect power connector (J2) to the Incubator Board.

5. At the **:** prompt type **rsinc ?** (**?** = letter of Section under test) and press ENTER. Verify the section resets.

6. Reset power to the mini VIDAS and immediately type **burnin** on the Diagnostic Terminal. The instrument will run the burnin protocol, which tests all motors in the instrument. Allow the instrument to run approximately 30 minutes.

7. At the **:** prompt, type **errs** on the Diagnostic Terminal and check for Scanner Errors. Correct any problems found.

8. At the **:** prompt, type **dincs** on the Diagnostic Terminal and check for Section errors. Correct any problems found.

9. Remove the serial cable from J7 on the Scanner Board.

10. Restore the mini VIDAS to normal operating condition.

Chapter Seven G: **Temperature**

The temperature range of the SPR block is 37°C ±1.5°C and should not vary more than ±0.5°C from the average of both Sections. The tray temperature range is 37°C ±1.7°C and should not vary more than ±0.7°C from the average of both Sections. If the temperature drifts outside these limits and a run is started, an error message is generated. To view temperature, proceed as follows:

1. Close all instrument covers and allow a 30 minute warm up.

2. Select **Section Status** on the **Main Menu**. Then select **Display temperatures**. The Temperature screen will display.

3. Verify all SPR temperatures report 37°C ±1.5°C with a maximum difference of ±0.5°C.

4. Verify all Tray temperatures report 37°C ±1.7°C with a maximum difference of ±0.7°C.

5. Press the **Previous Screen** key to return to the **Main Menu**.

Temperature Tests

To verify temperatures in the instrument you will need two precision (±0.2°C) thermistors (P/N 106007-1 or equivalent). One thermistor is placed in the SPR block, while the other is placed in the Tray.

Tray Temperature

To verify Tray temperature, proceed as follows:

1. Place the thermistor in the center of slot 3 or 4 in the Tray; use a Reagent Strip to hold the thermistor in place. Then, connect the other end to a Digital Multimeter set to read resistance.

2. Close all instrument covers and allow a one-hour warmup.

3. Verify temperature by measuring the thermistor resistance and converting the resistance to a temperature using the conversion chart (see Table 1).

4. Verify the Tray center surface is 37°C ±1.7°C.

5. If not, verify 28 VAC on the Incubator Board (TP5 to TP6) and on the Bay Interface Board (BIB) at connector J2 (J2-1 to J2-2).

6. If the voltage is good, measure the resistance of the Tray Heater (52 ± 6 Ohms) and the Tray Thermistor (10K ± 2K ohms at 25°C) at J2 on the BIB (see Figure 7-16).

SPR Temperature Test

☞ **NOTE**: Place a thermistor in the center of a SPR Block and secure in place with thermal sensitive epoxy or equivalent.

To verify SPR Block temperature, proceed as follows:

1. Place the SPR with thermistor in position 3 or 4 in the SPR Block. Then connect the other end to a Digital Multimeter set to read resistance.

2. Close all instrument doors and outer covers. Allow a one-hour warmup.

3. Verify temperature by measuring the thermistor resistance and converting the resistance to a temperature using the conversion chart (see Table 1).

4. Verify the Block center surface is 37°C ±1.5°C.

5. If not verify 28 VAC on the Incubator Board (TP5 to TP6) and on the Bay Interface Board (BIB) at connector J1 (J1-1 to J1-2).

6. If the voltage is good, measure the resistance of the Block Heater (52 ± 6 Ohms) and the Block Thermistor (10K ± 2K ohms @ 25°C) at J1 on the BIB (see Figure 7-16).

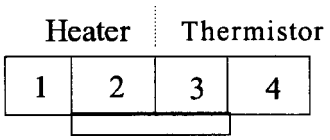


Figure 7-16 Block Incubator Board

Table 1 Thermistor Resistance vs. Resistance Conversion Chart

	Temp	35°C	36°C	37°C	38°C	39°C
R	0.0	6531	6266	6016	5776	5547
E	0.1	6505	6241	5992	5735	
S	0.2	6478	6216	5968	5730	
I	0.3	6452	6191	5944	5707	
S	0.4	6425	6166	5920	5684	
T	0.5	6399	6141	5896	5661	
A	0.6	6372	6116	5872	5638	
N	0.7	6345	6091	5848	5615	
C	0.8	6319	6066	5824	5592	
E	0.9	6292	6041	5800	5569	

Chapter Eight: **Preventive Maintenance**

WARNING! **POTENTIAL BIOHAZARDOUS MATERIAL —** Instrument surfaces and contaminated test kit components are potentially biohazardous and should be handled according to good laboratory practices. Observe universal precautions when operating the instrument and when performing maintenance or troubleshooting.

NOTE: Perform routine decontamination of the mini VIDAS prior to any service or maintenance.

Perform the following Preventive Maintenance procedure every twelve months.

1. Obtain the mini VIDAS 1 year PM kit, (P/N 527199-1).

2. Review DESIGN NOTES and SERVICE BULLETINS for necessary updates.

3. Connect a Terminal (Laptop) to serial cable (P/N 527807-1) and plug this cable into J7 on the Scanner Board.

   a. Type **errs** and press **ENTER**. Record any major errors.

   b. Type the command **dincs** and press **ENTER**. Record any Section Errors.

   c. Type **stat** and press **ENTER.** Record the OPTIPOT value; acceptable range = 565 ± 50. If this is out of spec, optics calibration must be performed in step 30.

4. Check and update Software and Firmware, if necessary. To check Software and Firmware installed, proceed as follows:

   a. At the **MAIN MENU,** enter **2** on the keypad and press the ↵ key. The **SHOW VERSION** screen will appear. Record the mini VIDAS version of software on the PM checklist.

   b. Record the Firmware, Scanner, and Incubator versions of firmware on the PM checklist.

5. If the mini VIDAS is interfaced deselect **Missing ID** from **LIS User Options Menu**,

6. Verify the Tray and SPR Block temperatures. Select **Section Status** from the main menu. Then select **Display Temperatures**.

SPR Block:	37°C ± 1.5°C. ±0.5°C matching Block-to-Block
Tray:	37°C ± 1.7°C. ±0.7°C matching Tray-to-Tray

7. Clean module covers and perform preliminary decontamination on exterior of module (see Appendix A).

8. Inspect AC power cord for proper routing and integrity of insulation.

9. Verify the bench is level within 5°. All testing and alignments should be performed at the operating location of the module. The module tends to be re-positioned during and after the PM, and this could affect the results. Ensure the module is properly ventilated.

10. Power off the Module and continue decontamination of the Module in accordance with the procedure in Appendix A.

11. Vacuum dust and debris from interior of module (including power supply). Also clean the dust and debris from the benchtop.

12. Inspect front panel treelock fasteners, mounting screws (if so equipped) and integrity of safety cables. Replace missing or broken parts.

13. Verify tightness of all mounting hardware for PC boards, motors, pulleys, mounting brackets, sensor brackets, and pipette weight plates.

14. Clean and inspect the SPR grommet plates and SPR Pump Seals. If necessary, replace any bad seals. Replace all seals at a yearly interval.

15. Check springs in the SPR liners in the SPR Blocks for the correct spring action. Disassemble and clean if there are substances on the SPR liners. Replace the springs if the liners are sticking. Replace at a yearly interval from the PM kit.

16. Check the SPR heater block cover plate. If the cover plate appearance has faded, replace it.

17. Inspect Scanner and Tower drive belts and bearings for damage, wear, and alignment. Replace the belts or bearings as necessary.

18. Clean Scanner drive screw. **DO NOT LUBRICATE**.

19. Check Scanner Carriage Assembly guide wheels and E-chain for smooth rotation and alignment on the guide rail. Check E-Chain for damaged and or broken links. The links should be aligned in the same direction. (See Internal Installations). Verify that the Scanner travels freely on the shaft with the belt removed.

20. Remove the front LED panel to clean and lubricate tower drive screws. Also clean and lubricate scanner guide rail.

21. Clean Tray reflector plates, and tray guides. Check each tray for excessive play (especially if you are getting bar code errors).

22. Check tray motor gears for cracks, damage, wear, and set-screw tightness.

23. Verify mechanical and sensor alignments. Reference error codes recorded in step 3 of this procedure and correct as required (see - Maintenance).

24. Power on the module and verify Scanner Alignments, paying particular attention to the following (See - Maintenance):

    - The home flag, tray edges
    - The bar code reader, verify each section

WARNING! Be Careful not to place the feeler gauge over the sapphire window on the Scanhead, as this may scratch and damage the window, and result in incorrect measurements.

    - The .006 inch gap between Scanhead and Auto Calibration Bracket. If the system is calibrated and then you adjust the auto-cal bracket, you will need to perform a **store-std** (to save the possible new value).

25. Verify Power Supply Voltages.

BOARD	TEST POINTS	VOLTAGE	POWER SUPPLY BOARD TEST POINTS
Scanner	TP10 to TP12 (gnd)	+5.0 ± 0.2 VDC	TP9 to TP11 (gnd)
Scanner	TP5 to TP6 (gnd)	+12 ± 0.5 VDC	TP7 to TP11 (gnd)
Scanner	TP7 to TP6 (gnd)	-12 ± 0.6 VDC	TP8 to TP11 (gnd)
Scanner	TP11 to TP13 (gnd)	10.00 to 16.00 VDC	TP6 to TP11 (gnd)
Incubator	TP6 to TP5 (gnd)	21.0 to 38.0 VAC	TP4 to TP3
VIC	TP7 to TP3 (gnd)	+12.0 ± 0.5 VDC (VPP LED ON)	TP10 to TP11 (gnd)
Printer	CN5 24V to CN5 GND	+24 ± 2.0 VDC	TP5 to TP11 (gnd)

26. Observe that the Temperature LED's are flashing.

27. Check the operation of the High Voltage Power Supply (HVPS) fan assembly. Replace HVPS fan Assembly yearly.

28. Run section diagnostics in all bays after checking alignments (see Troubleshooting).

29. Clean optics lenses on Scanhead and Bar-Code Reader with lens paper.

30. Place VIDAS Calibration Strips in Tray A. Check optics calibrations as follows:

    a. Type the command **tfa trayread a** and press **ENTER.** If Optics are out of range, recalibrate as necessary (see Maintenance — Optics Calibration).

b. Perform an **EXTR** command if optics calibration is not needed. Verify the difference between the **BR** average and the **SR** average is less than 50 counts. If this check is out-of-range, optics calibration must be performed (Maintenance — Optics Calibration).

31. Return the mini VIDAS to normal operating mode. Remove the diagnostic cable. Return all switches and jumpers to normal (run) settings on the Incubator and Scanner Boards. Cycle power to reset the logic circuits.

32. Verify optics calibration (see Maintenance — Optics Calibration).

33. Record the VIDAS Calibrator Strip Lot number, expiration date, and RFV value on the PM Checklist.

34. Perform Quality Control Test (QCT) Strip Assay in all slots. (see Appendix B).

35. Record QCT Lot number, and the requested test results on the PM Checklist.

36. Using the **TEST MENU,** test the Display, Keypad, Audio and Thermal printer.

37. After PM has been performed, it is necessary for operator to rerun assay standards for those assays that utilize the stored curve. This will ensure Quality Control.

38. If the **Missing ID** option was deselected (step 5), select it again.

PM CHECKLIST

Account Name:_____ System No.: _____

City / State: _____ Phone No.: (___) _____

Contact Name: _____ IR.#: _____

FSE Signature: _____ Date: _____

mini VIDAS Module

_____ Review "Design Notes" or Service Bulletins incorporated.

_____ Electrical / mechanical connections (AC power cords, cables, fans and filters.)

SOFTWARE VERSION: _____

Serial #: _____; VIC Firmware: _____ Scanner_____,
Incubator A:_____ B:_____

V1

_____ Decontamination.

_____ Verify module is on a level surface and has proper clearances.

_____ Power supply voltages.

_____ Clean Scanner drive screw.

_____ Clean / Lube Scanner guide rail.

_____ Inspect Scanner / Tower drive belts / bearings.

_____ Clean / Lube Tower drive screws.

_____ Inspect / Clean / Replace SPR grommets and grommet plates.

_____ Verify mechanical and sensor alignments.*

_____ Verify Optics Calibration.

_____ Calibration Strip Mean Value.

_____ Calibration Strip Lot #.

_____ Calibration Strip Expiration date.

_____ Passed QCT ASSAY. *

_____ QCT Lot #

_____ Record Pipette Low Volume Mean Value:

_____ Record High Volume Mean Value:

_____ Record Read 3 RFV Test Mean Value:

_____ Display Test

_____ Keypad Test

_____ Audio Test

_____ Printer Test

* Per Specifications

Appendix A: **Decontamination**

General

WARNING! **POTENTIAL BIOHAZARDOUS MATERIAL —** Any instrument that deals with clinical specimens, such as serum or other body fluids should be considered potentially contaminated with infectious materials. The mini VIDAS is designed to minimize contamination, yet accidental spills, pipetting mishaps, or SPR carry-over must be considered

NOTE: Routine decontamination of the mini VIDAS should be performed prior to any service or maintenance.

Routine Decontamination

Before performing any service or maintenance, have the lab personnel decontaminate the mini VIDAS as follows:

1. Verify all tests have finished, and that the SPRs and Reagent Strips are removed.

2. Turn the mini VIDAS Module power switch to (**0**) OFF. Open the SPR compartment doors and tilt the SPR blocks toward you.

3. Moisten a Dacron swab with a germicidal detergent solution and clean inside each SPR sleeve.

4. Moisten a foam or gauze sponge with detergent solution. Holding the sponge with a curved forceps, swab the underside and back of the SPR block.

5. Remove the front panel and manually pull the Reagent Strip Trays out to their outermost position.

6. Moisten a foam or gauze sponge with detergent solution. Holding the sponge with the forceps, clean each tray channel making sure to wipe the underside of the locator bar.

7. Remove the plastic shield pans beneath the Reagent Strip Trays and clean with a sponge moistened in a detergent solution.

8. Carefully clean the Reagent Strip Compartment Lid and front of the mini VIDAS module with a detergent solution.

9. Repeat steps 3 through 7 with a **10.0% bleach solution**, allowing a minimum of **10 minutes** for the solution to react.

10. Due to the corrosive nature of bleach, rinse each area with a sponge or swab moistened in distilled water.

11. Carefully push in each Reagent Strip Tray and replace the plastic shield pans. Verify the pans fit into the grooves on each side. Be sure the wires on the bottom of the tray are above the pan.

12. Reinstall the front panel. Close all the Reagent Strip Compartment Lids and SPR doors.

13. Place the mini VIDAS AC power switch ON (**1**). It will automatically reset and move the SPR tower and Reagent Tray to the "park" position for each section.

Scanhead Decontamination

A mini VIDAS Scanhead removed as part of a repair should be decontaminated before returning to bioMérieux. To decontaminate a Scanhead, proceed as follows:

1. Moisten a foam or gauze sponge with germicidal detergent solution.

2. Wipe the entire Scanhead body, paying particular attention to the optical system housing and bar code reader assembly.

3. Wipe the E-chain assembly and any apparent sharp corners or edges.

4. Moisten a foam or gauze sponge with a 10% bleach solution and repeat steps 2 and 3. Allow a minimum of 10 minutes for the bleach solution to react.

5. Rinse the entire Scanhead and E-chain with a sponge or swab moistened with distilled water.

6. Place a Decontamination Sticker on the Bar Code Reader on the Scanhead Assembly.

Tool Decontamination

All tools used while servicing the mini VIDAS should be cleaned using a 10% bleach solution as follows:

1. Moisten a foam or gauze sponge in the bleach solution and wipe all tool surfaces.

2. Allow the bleach solution to react for a minimum of 10 minutes.

3. Wipe off the bleach with water using a moistened foam or gauze sponge. Be certain to rinse all areas thoroughly.

Appendix B: Quality Control Test Strip

The VIDAS® Quality Control Test (QCT) Strip and QCT SPRs have been developed to aid Field Service personnel in the testing of pipette mechanisms, SPR sealing, and testing the Optical Scanner for accuracy. The QCT Strip is **not a <u>calibrator</u>**. Each QCT test requires one QCT Reagent Strip and one QCT SPR. The QCT Strip consists of 10 wells covered with a foil seal and paper label. All fluorometric determinations take place in the last well of the strip, an optically clear cuvette. The other wells contain reagents needed for the test.

All steps of the test run automatically, and consist of a series of enzyme-substrate reactions.

Enzyme = Alkaline Phosphatase

↓

SUBSTRATE (4-methylumbelliferyl phosphate) → 4-mythylumbelliferone (fluorescent)

A small volume of enzyme is transferred to the cuvette and allowed to react with the substrate (for the "Small Volume Pipette Test") and a fluorescence reading is taken = READ 1

A larger volume of enzyme is then transferred to the cuvette and mixed with substrate before another fluorescence reading is taken = READ 2

After a short incubation, another fluorescence reading is taken = READ 3

For the "Large Volume Pipette Test," a large volume of solution is transferred out of the cuvette and an equal volume of potassium phosphate ("stop") solution is then transferred into the cuvette and mixed with the solution to quench further reaction in the cuvette. A final reading is taken = READ 4

After the assay is completed, ratios are generated by the computer from the different fluorescence readings to determine if the pipette mechanisms and SPRs are transferring the correct volume of enzyme.

$$\text{Low Volume Pipette test Ratio} = \frac{\text{READ 1 RFV}}{\text{READ 2 RFV}}$$

$$\text{High Volume Pipette test Ratio} = \frac{\text{READ 3 RFV}}{\text{READ 4 RFV}}$$

(minus a background correction factor)

The RFV of READ 3 is used to diagnose optical problems.

The Report

A two-page report prints out. The first page summarizes each position in the mini VIDAS as passed / failed for Temperature, Optics, and Pipette Checks.

When an error occurs during the QCT Assay, the report will expand on the failed check, (e.g., Pipette Mechanism Failure).

☞ **NOTE**: QCT does not diagnose temperature problems. Software, separate from the QCT protocol, monitors temperature and the information prints on the QCT report after being accessed from the other program.

The second page is a data sheet, listing the results by position for each section, and the section means for the following:

- Background
- Read 1
- Read 2
- Read 3
- Low Volume Pipette Test
- High Volume Pipette Test

Confirm all test failures by running a fresh QCT Reagent Strip and QCT SPR in the position(s) that failed. Take a failed section off-line until the problem is corrected.

Run 12 QCT Strips after Preventive Maintenance or any time an optics or pipetting problem is suspected. Running less than 12 tests may not be sufficient to detect all possible problems. It is permissible to run a single QCT Strip in a particular tray position that fails the original test, if the other positions tested passed.

Errors

Errors reported by QCT and some things to check are:

SPR Seal Error	♦ Check the High and Low Pipette Volume results. ♦ Check the SPR - Hole in center of seal. ♦ Replace the Grommet Seal. ♦ Check the Alignment of the SPR Block to the Pump Assembly. Latches on grommet retainer plate are not centered between SPR positions 1&2 and 5&6. ♦ Check Tower Alignment.
Pipette Mechanism	♦ QCT kit has been stressed. Check Background reads vs. age of kit. A really high Background reading with short age indicates a stressed kit. ♦ Check the High and Low Pipette Volume results by slot and section. ♦ Pump ratio (volume) too high: 1. Check for bent Grommet Retainer Plate. 2. Replace Grommet Seal(s). ♦ Pump ratio (volume) too Low: 1. Check Tower Alignment. 2. Replace Grommet Seal(s). 3. SPR Block mis-aligned. 4. Replace Pump Assembly.
Optics Error RFV out of range	♦ QCT kit has been stressed. Check Background read vs. age of kit. A really high Background reading with short age indicates a stressed kit. ♦ Check Optics Calibration. ♦ Check Section Alignments. ♦ QCT kit is defective. Check Read J3 section average.
Background RFV out of range	♦ QCT kit has been stressed. Check Background read vs. age of kit. A really high Background reading with short age indicates a stressed kit. ♦ Run an OPT assay with and without VIDAS Calibration Strips. ♦ Check Optics Calibration ♦ QCT kit is defective.

QCT Assay

To run a QCT (Quality Control Test) assay on the mini VIDAS proceed as follows:

1. Power up the mini VIDAS.

2. Load QCT Reagent Strips into all tray positions, and QCT SPRs into all SPR compartments. Allow a 20-minute warmup.

3. At the **MAIN MENU,** select **STATUS SCREEN.**

4. Select **Display Temperatures**. Verify the Tray temperatures are 37°C ± 1.7°C and SPR are temperatures are 37°C ± 1.5°C.

5. On the keypad, enter **3278** and press the ↵ key. The **Express Start Menu** appears on the screen (see Figure 1).

6. Select **QCT**. Starting Section message appears briefly. The **Main Menu** will appear and the test starts.

7. Press the **Previous Screen** key to return to the **MAIN MENU**.

8. Verify no error messages appear on the screen during the run or printout after the assay completes.

9. Verify the test printout passes each position in the instrument, indicated by an **OK**. If not, verify the "High and Low Volume Pipette" results are within the range specified in the QC mean report included in the kit.

10. Verify "Optical Read 3" RFV's are within ±175 counts of the reported QC mean report included in the kit.

Appendix C: Terminal Setup

Any laptop personal computer capable of VT-100 emulation can be the Diagnostic Terminal for troubleshooting the mini VIDAS.

To setup Hyperterminal Terminal proceed as follows:

1. Click on **Start**
2. Select **Programs**.
3. Select **Accessories**.
4. Select **Communications**.
5. Click on **Hyperterminal**. The C:\Program Files\AC... screen appears.
6. Double click **Hyperterm** icon. A new Hyperterminal window will open.
7. Name the session in the **Connection Description** window (suggest Diagnostics).
8. Select Icon (suggest Phone w/ Beakers - scroll right, 3rd from right end of list).
9. Click on **OK**. A **Connect To** window will appear.
10. Click on **Connect Using** and select **Direct to Com2** (or appropriate Port).
11. Click **OK**.
12. **COM2 Properties** window opens. Set properties as follows:

Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Xon/Xoff

13. Click on **OK**.
14. Click on **File** and **Exit**. Save the session.
15. The Hyperterm Diagnostics will appear in the C:\Program Files\AC
16. Select **Diagnostics**. Then click on **File** and **Create Shortcut**.
17. Shortcut to Diagnostics will appear. Drag the shortcut to the desktop. The icon selected in Step 8 will appear on the desktop.
18. Close the C:\Program Files\AC... window.

Your Diagnostic Hyperterminal is now ready for use when troubleshooting a mini VIDAS.

Appendix D: Boards & Schematics

mini VIDAS Block Diagram

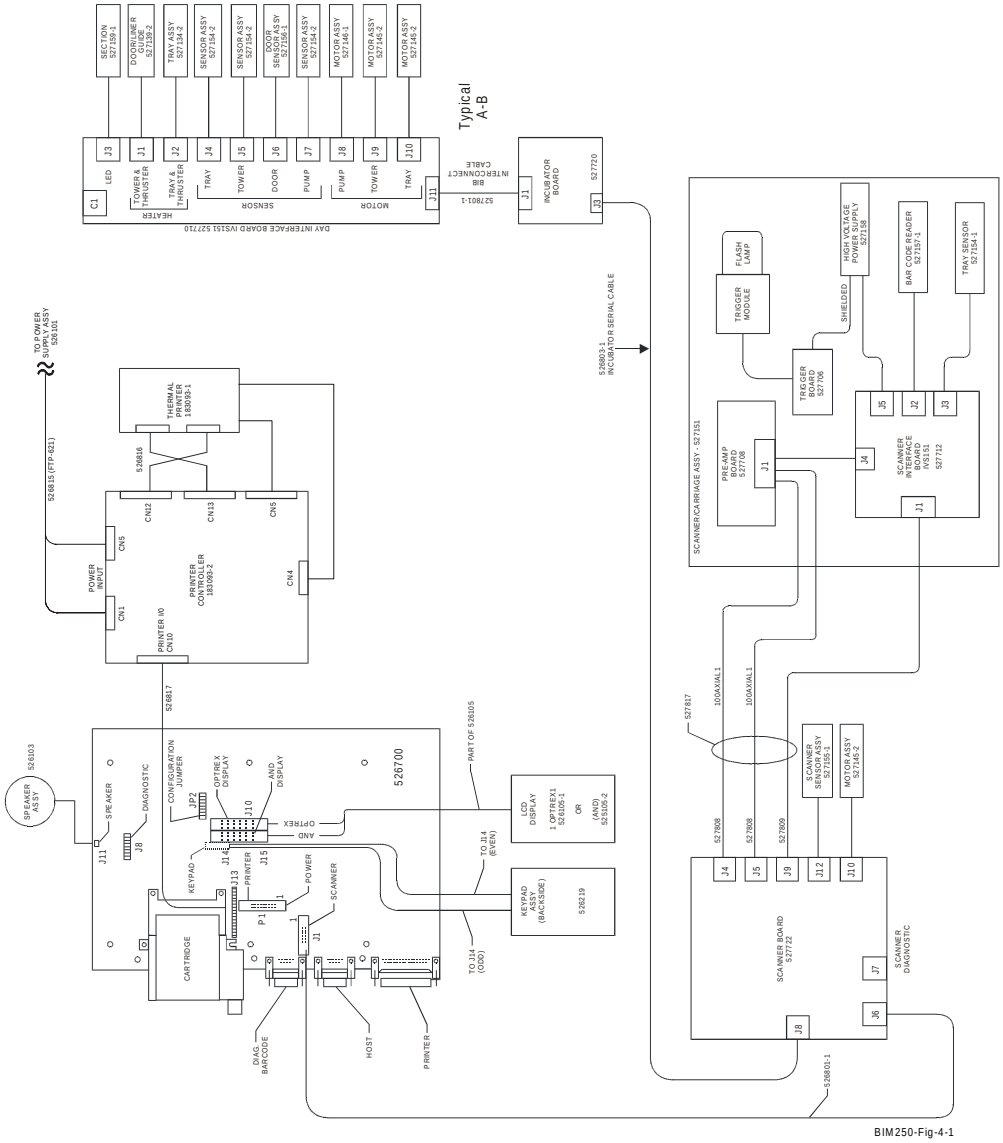


Figure D-1 mini VIDAS Block Diagram

VIDAS Internal Computer (VIC)

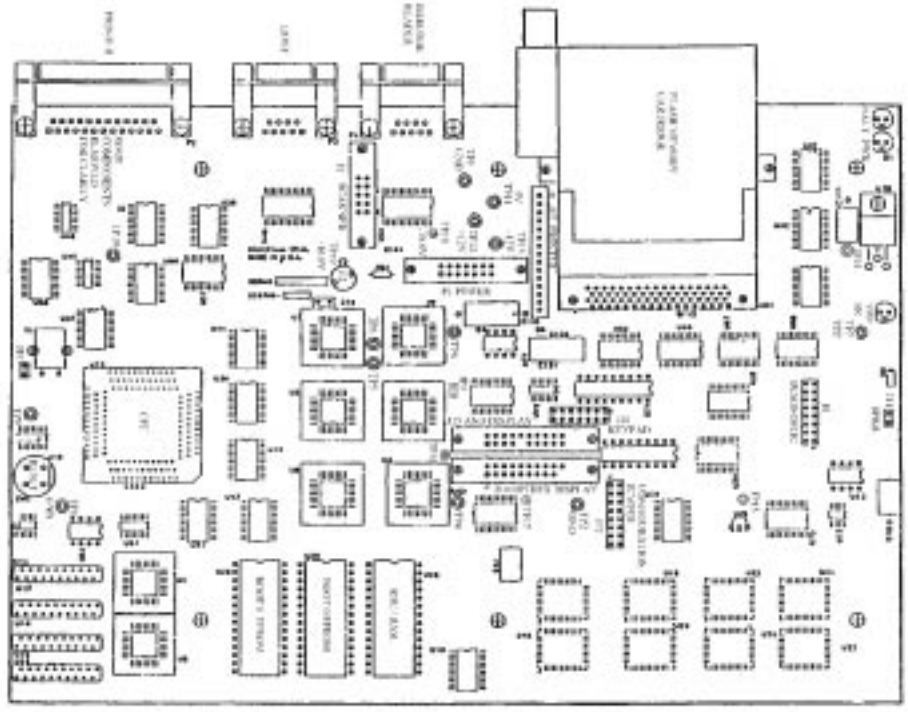


Figure D-2 VIC, P/N 526700-2 Shown

LEDs:
HALT PWR VPP ON

Fuse:
F2 = 5.0A

Standard Jumper Settings:
JP1 IN
JP3 OUT

Jumper JP2

Position	OUT	IN
1 (pins 1 & 2)	**Optrex Display**	**AND Display**
2 (pins 3 & 4)	**V12**	**V24**
3 (pins 5 & 6)	**Seiko LTP 451** **Fujitsu FTP 641**	**Seiko FTP 5442**
4 (pins 7 & 8)	**Seiko LTP 451** **Seiko FTP 5442**	**Fujitsu FTP 641**
5 (pins 9 & 10)	**Not Used**	**Not Used**
6 (pins 11 & 12)		**Diagnostic Use**
7 (pins 13 & 14)		**Development Use**
8 (pins 15 & 16)		**Development Use**

Test Points:

TP1 GND	**TP6 UCAS**	**TP11 +5 VDC**	**TP16 VADJ1**
TP2 GND	**TP7 VPP (+12 VDC)**	**TP12 +12 VDC**	**TP17 VADJ2**
TP3 GND	**TP8 DTACK**	**TP13 -12 VDC**	**TP18 -10.8V**
TP4 RAS	**TP9 HALT**	**TP14 MCVCC**	**TP19 -10.8V**
TP5 LCAS	**TP10 SCLK**	**TP15 -VREF**	

Scanner Board

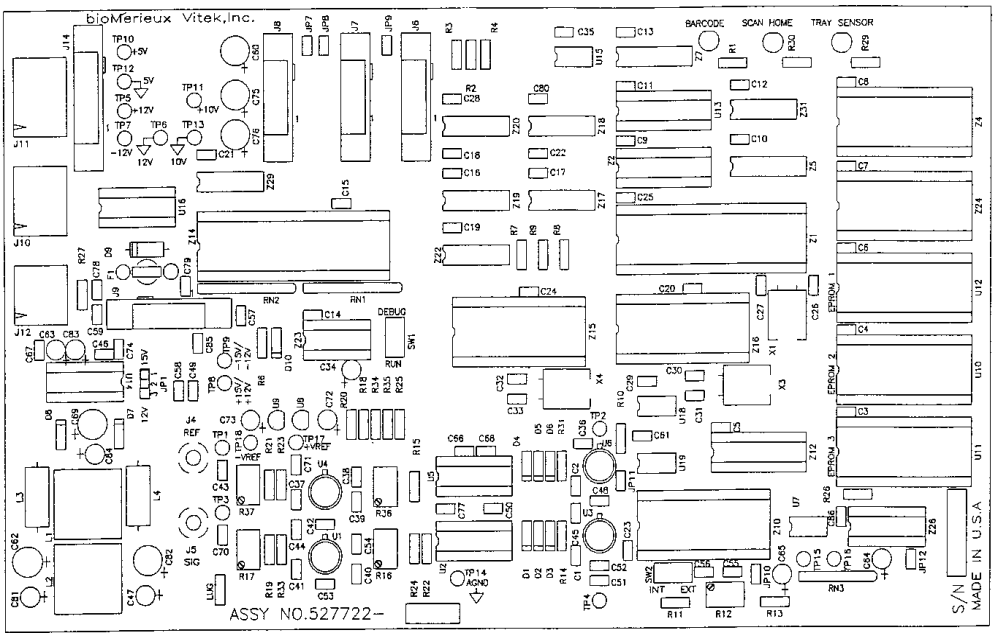


Figure D-3 Scanner Board, P/N 527720-2 shown, P/N 527722-3 shown

LEDs
BARCODE SCANNER HOME TRAY SENSOR (Tray Edge)

Fuse
F1 = 1.5A (Scanner Motor)

Switch Settings

SW1	**RUN**
SW2	**EXT**

Standard Jumper Settings

JP1	JP7	JP8	JP9	JP10	JP11	JP12
1-2	IN	IN	OUT	IN	OUT	IN

Jumper Definitions

Converter Output	**JP1: 1 - 2 = 15 Volts**	**JP1: 2 - 3 = 12 Volts**
Analog/Digital GND's	**JP10: IN = Common**	**JP10: OUT = Not common**
Auto Calibration (digipots)	**JP11: IN = Disabled**	**JP11: OUT = Enabled**
Production Test	**JP12: IN = Normal**	**JP12: OUT = Test Only**

Test Points

TP1	**Reference In**	**TP7**	**-12 VDC**	**TP13**	**+10 V Gnd.**
TP2	**Reference Bias (mv)**	**TP8**	**+15 V / +12V**	**TP14**	**AGND (Analog)**
TP3	**Signal In**	**TP9**	**-15V / -12 V**	**TP15**	**A/D Reference Input**
TP4	**Signal Bias (mv)**	**TP10**	**+5.0 VDC**	**TP16**	**A/D Signal Input**
TP5	**+12 VDC**	**TP11**	**+10 VDC**	**TP17**	**+VREF.**
TP6	**±12 V Gnd.**	**TP12**	**+5 V Gnd.**	**TP18**	**-VREF.**

Adjustments

R12 - ZERO ADJ.	**R16 - SIG. BIAS (mv)**	**R36 - REF. BIAS (mv)**
	R17 - SIGNAL GAIN	**R37 - REF. GAIN**

Incubator Board

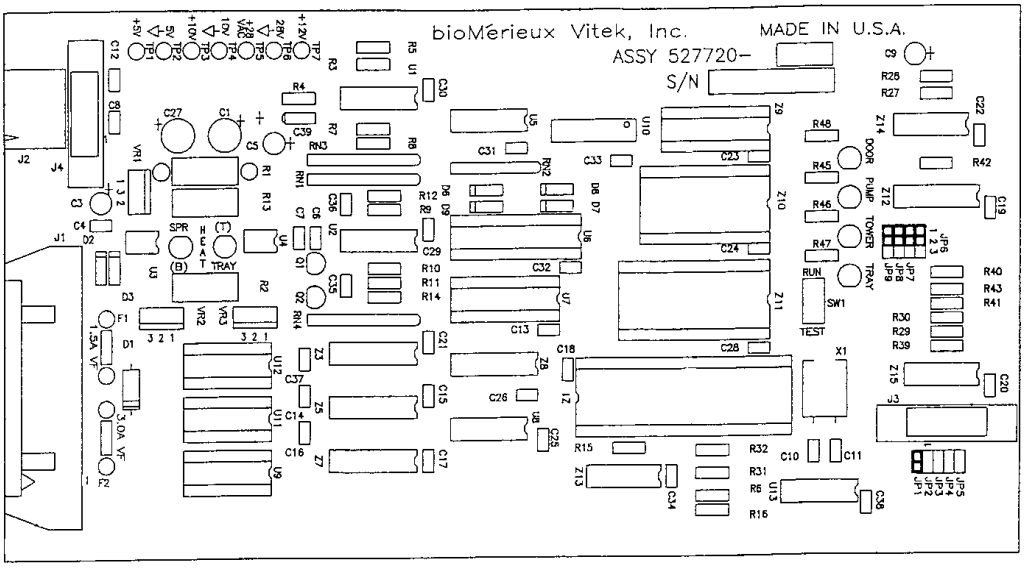


Figure D-4 Incubator Board

Address and Reset Jumper Settings

Jumpers JP1 through JP9 are configured by section (Bay) location as shown below.

Section	Reset Jumper					Address Jumpers			
	JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP9
A	IN	None	None	None	None	1-2	1-2	1-2	2-3
B	None	IN	None	None	None	1-2	1-2	2-3	1-2

Switch Settings

SW1 -- RUN

Test Points

TP1	TP2	TP3	TP4	TP5	TP6	TP7
+5 VDC	5V Gnd.	+10 VDC	10V Gnd.	+28 VAC	28 VAC Comm.	+12 VDC

Fuses

F1 = 1.5A (Heaters) F2 = 3.0A (Motors)

LEDs

DOOR	TOWER	SPR (B) HEAT
PUMP	TRAY	TRAY (T) HEAT

Bay Interface Board

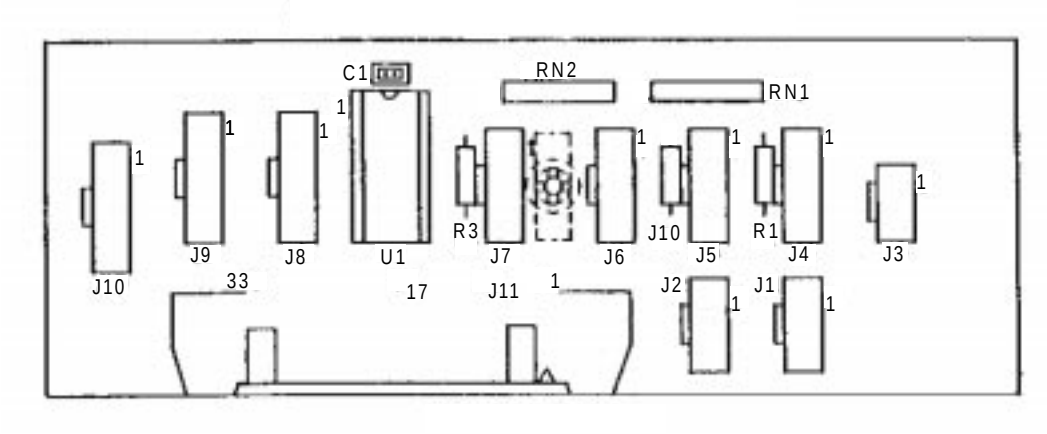


Figure D-5 Bay Interface Board

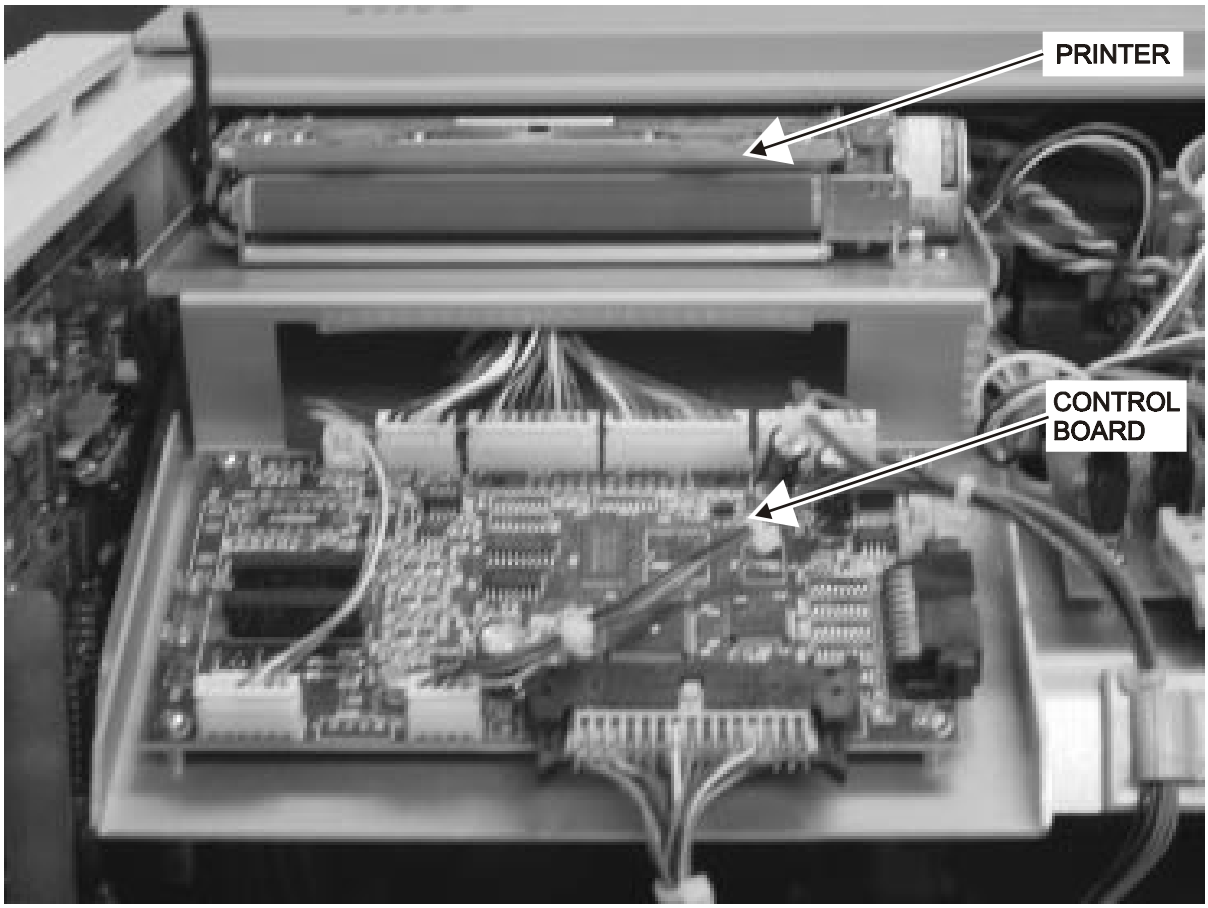
Switch Settings

None

Jumper Settings

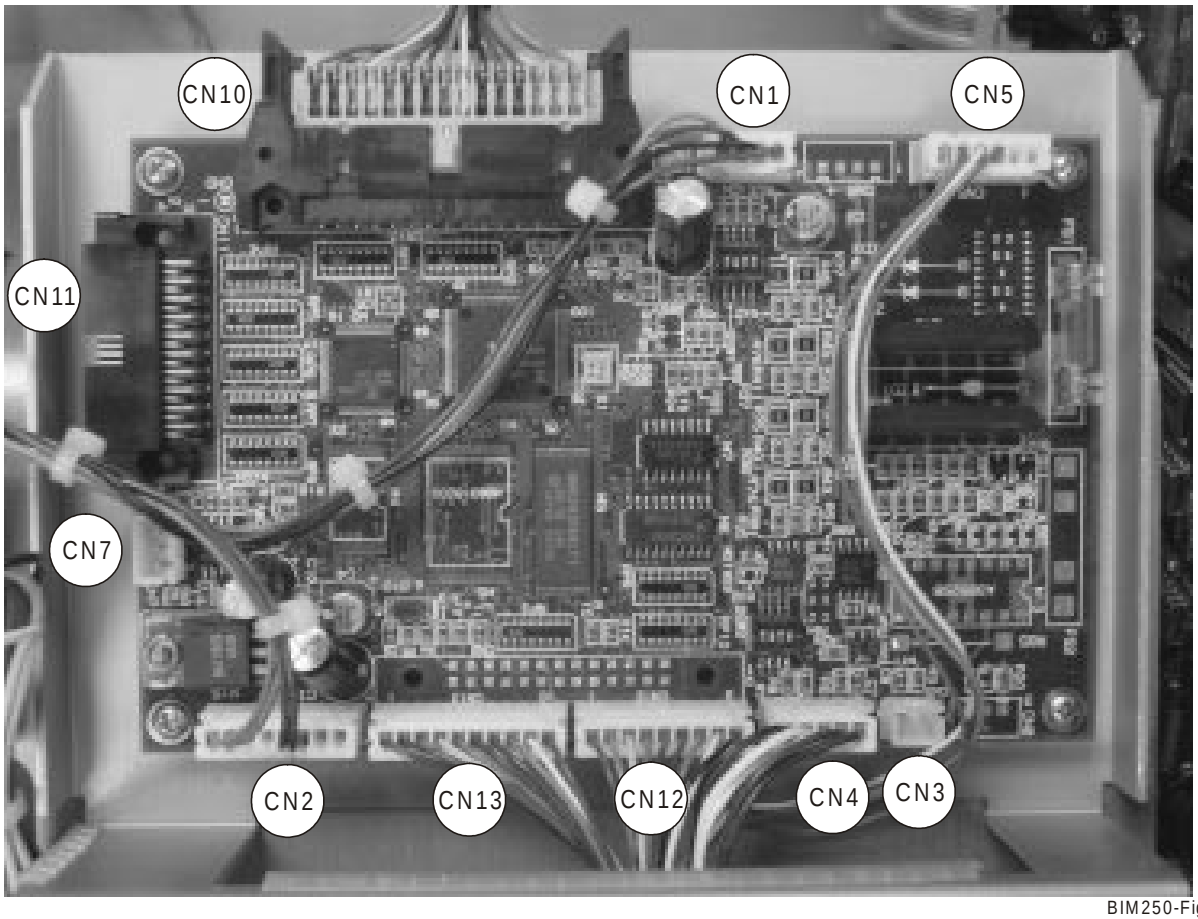
None

Fujitsu Thermal Printer



BIM250-Fig-D-6

Figure D-6 Thermal Printer



BIM250-Fig-D-7

Figure D-7 Thermal Printer Control Board and Connectors

Switch Settings

SW1	1	2	3	4
Position	OFF	OFF	ON	OFF
SW2	1	2	3	4
Position	ON	OFF	ON	OFF

Keypad

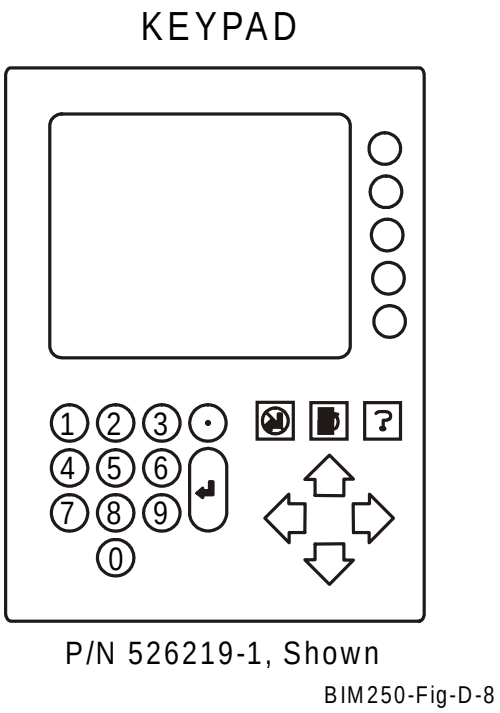


Figure D-8 Keypad

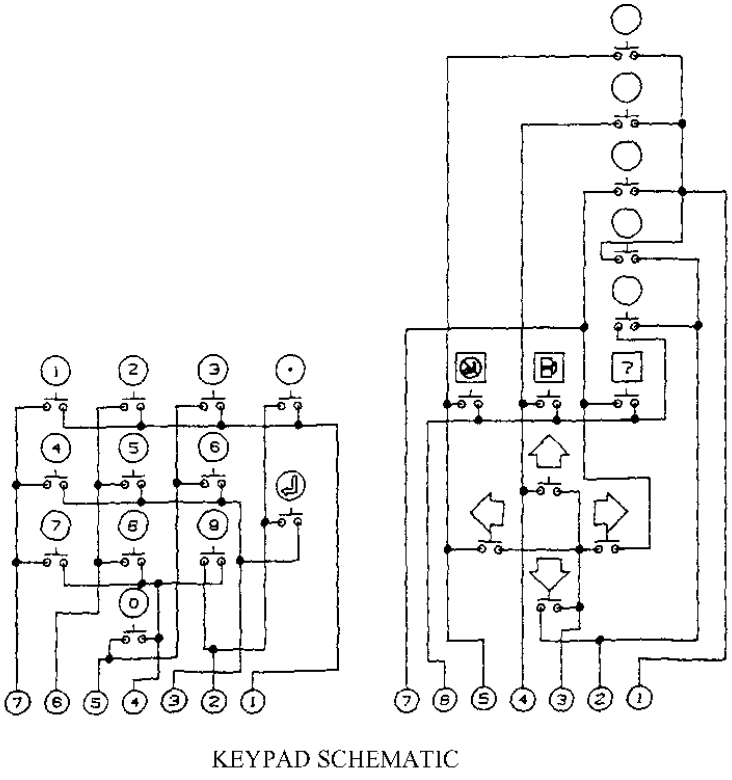


Figure D-9 Keypad Schematic

mini VIDAS Wiring Diagram

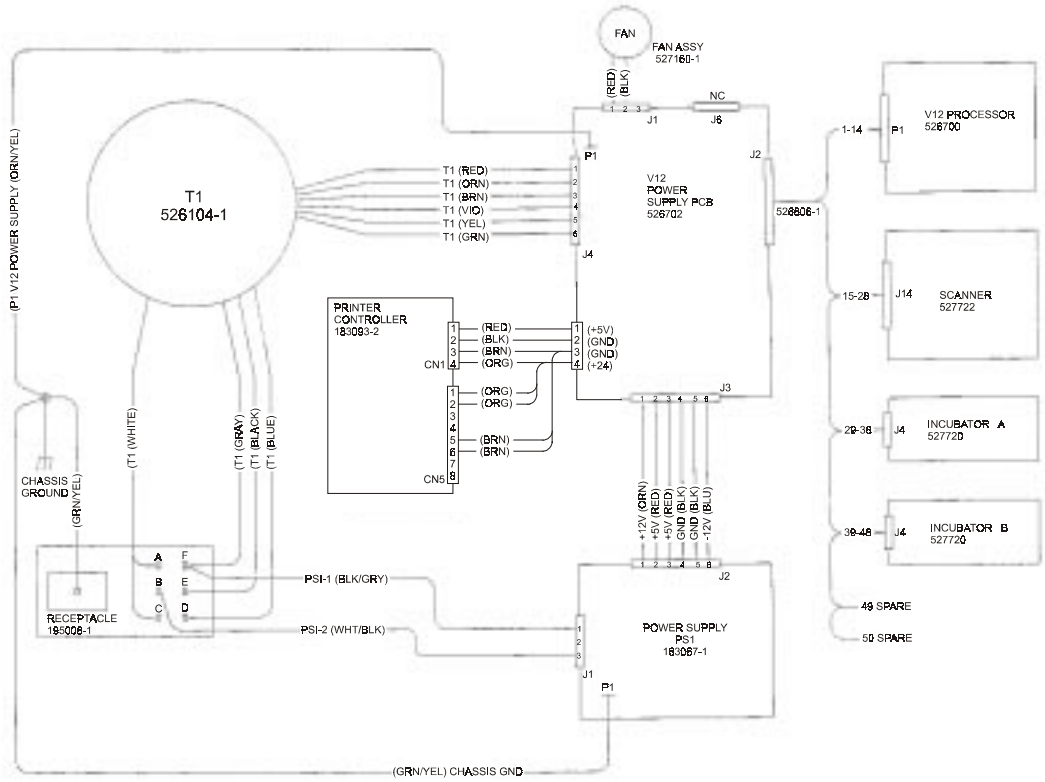


Figure D-10 mini VIDAS Wiring Diagram

Power Supply

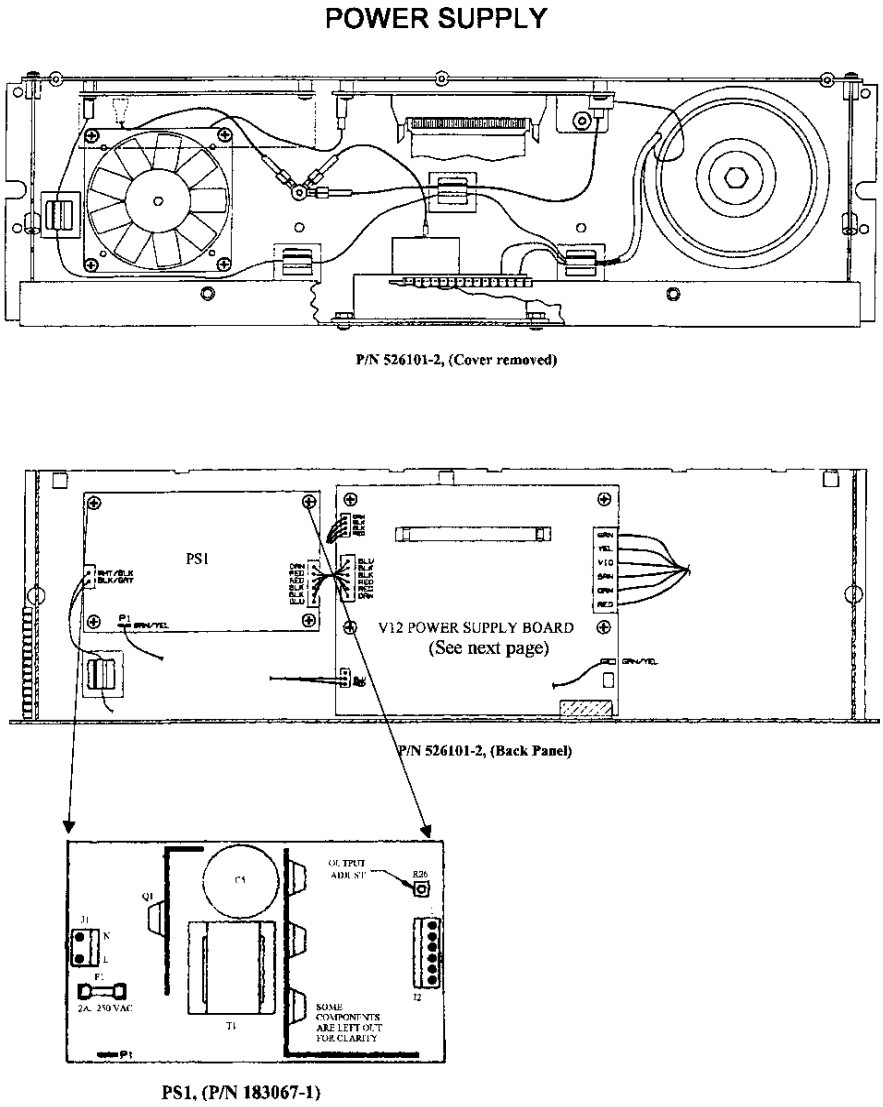
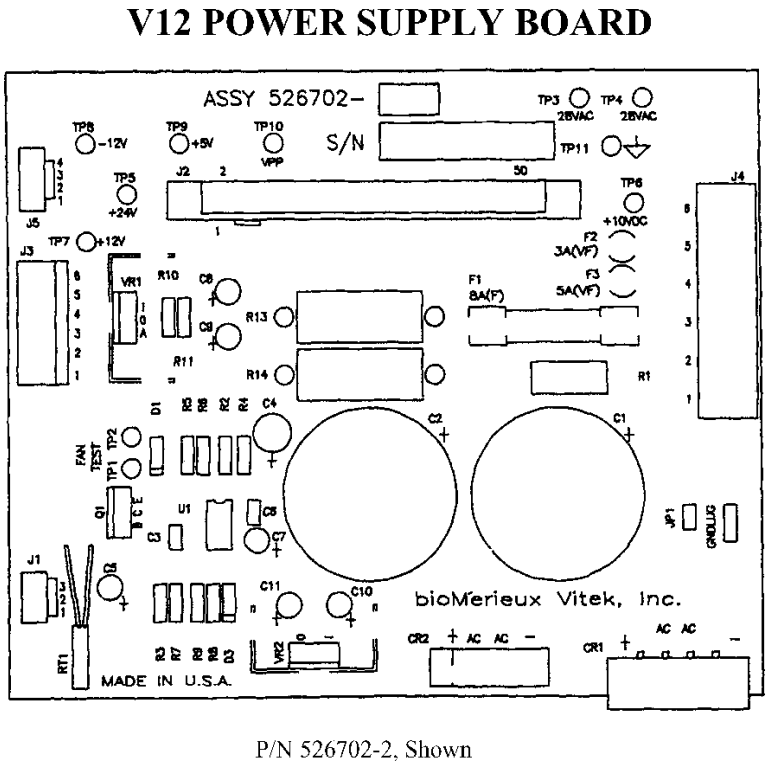


Figure D-11 Power Supply

PS1 Power Supply

Fuse
F1 = 2A

VIDAS 12 Power Supply Board



P/N 526702-2, Shown

Figure D-12 Power Supply Board

Test Points

VOLTAGE	TEST POINTS	VOLTAGE RANGE	ADJUSTMENT
+5 VDC	**TP9 to TP11 (gnd)**	**+5.0 ± 0.2 VDC**	**R26 on PS1.**
+12 VDC	**TP7 to TP11 (gnd)**	**+12 ± 0.5 VDC**	
-12 VDC	**TP8 to TP11 (gnd)**	**-12 ± 0.6 VDC**	
+12 VDC (VPP VIC Board)	**TP10 to TP11 (gnd)**	**+12.0 ± 0.5 VDC**	
+10 VDC	**TP6 to TP11 (gnd)**	**+10.0 to 16.0 VDC**	
+24 VDC (Thermal Printer)	**TP5 to TP11 (gnd)**	**+24 ± 2.0 VDC**	
28 VAC (Heaters)	**TP4 to TP3 (gnd)**	**21.0 to 38.0 VAC**	
FAN TEST	**TP1 to TP2 (use 10 Kohm resistor)**		

Fuses

F1 = 8.0A (Motors) F2 = 3.0A (Heaters) F3 = 5.0A (Printer & VIC bd.)

Standard Jumper Settings

JP1 - IN

Schematic V12 Power Supply Board

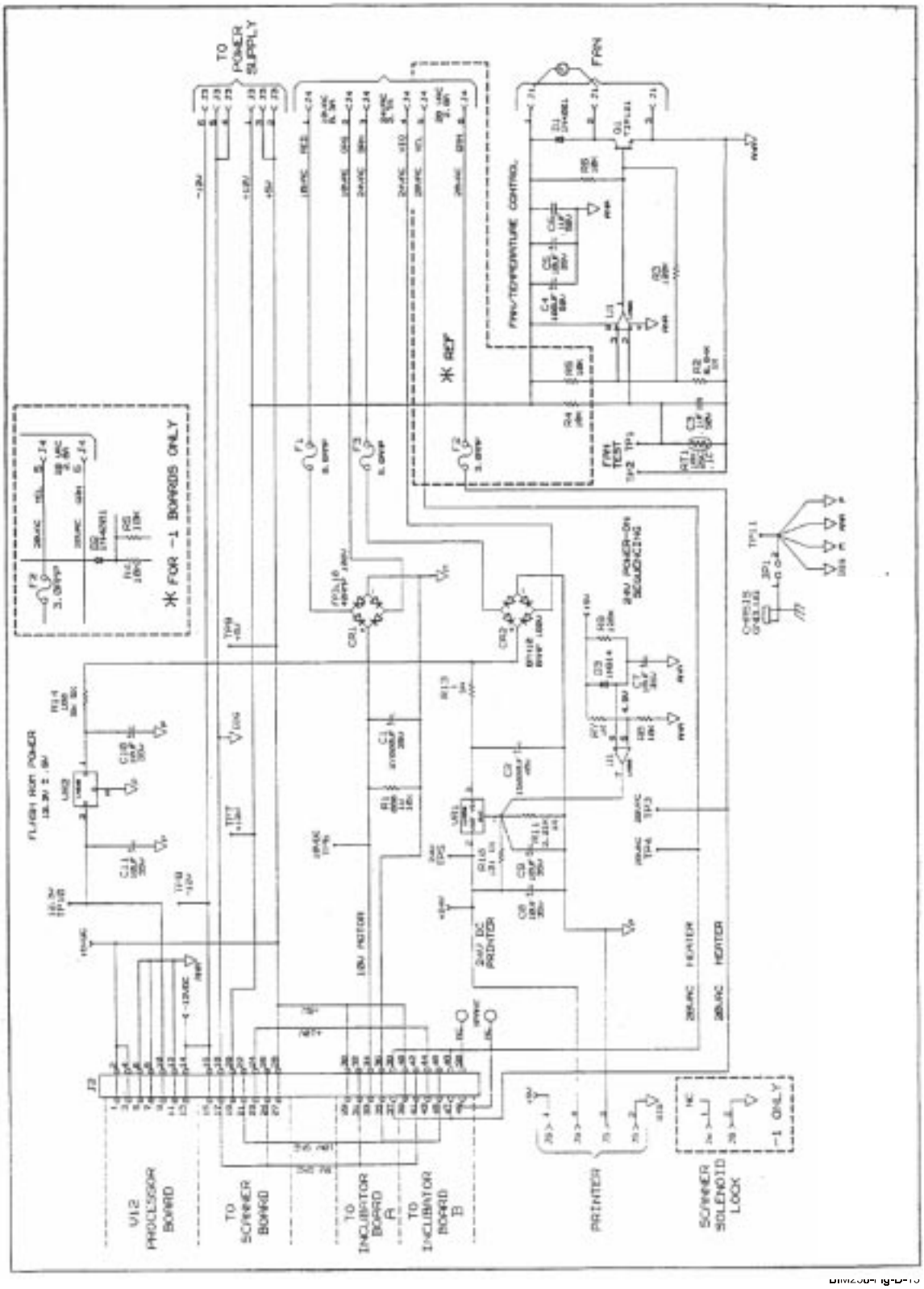


Figure D-13 V12 Power Supply Board Schematic

Spare Parts List

PART NUMBER	DESCRIPTION
169032-256	Flash Card (Used for idata backup)
183067-1	Power Supply, Switching
183079-4	Thermal Printer Paper
183093-2	Thermal Printer Board - Fujitsu
192802-8	Fuse, ABC 8A
192810-3	Fuse, 3 A, MDA
192817-1600	Fuse, 1.6A, 250V, GDC
192818-3	Fuse, 3 A Subminiature, Radial
192818-5	Fuse, 5 A Subminiature, Radial
330712-1	Rubber Foot
331800-3	Ball Bearing, Flanged Rad.
337021-1	Spring, SPR Block
338103-1	Plunger Nylon Ball 1/4-20
371114-1	Sensor / Tray Alignment Tool
371115-1	Tower Alignment Tool
371116-1	Tower Phasing Tool
371117-1	Pulley / Bar Code Reader Alignment Tool
371118-1	Tower Belt Tension Gauge
371118-2	Scanner Belt Tension Gauge
371147-2	Tray Wrench
371195-1	Tray Drive Engagement Tool
399100-1	Cross Level
380355-1	Bar-code Test Strip
399700-1	QCT Kit (use after every repair or PM)
399701-1	VIDAS Calibration Standard (Pouch of 6 Calibrators)
526101-1	Power Supply assembly – 220V – Seiko Printer
526101-3	Power Supply assembly – 120V – Seiko Printer
526101-5	Power Supply assembly - VDE - 220V
526101-6	Power Supply assembly – VDE 120V – Fujitsu Printer
526103-1	Speaker Assembly
526105-1	LCD Display Assy. - OPTREX
526107-1	Auto-calibration standard
526112-1	Printer Assembly - Fujitsu
526207-1	Scanner Lead Screw
526219-1	Keypad Assy.
526605-1	Fujitsu Printer Kit

PART NUMBER	DESCRIPTION
526700-4	V12 Internal Computer (VIC) Assy.
526702-2	Power Supply Board
527132-1	Tray Drive Assembly
527135-1	Tray Assembly
527139-11	Liner (SPR) Guide Assy.
527145-2	Motor Assy. (Scanner, Tower, Tray)
527146-3	Linear Motor Assy. (Pump Motor)
527148-3	Pump/Actuator Assy. (Pump Assembly)
527151-15	Scanner/Carriage Assy.
527154-1	Sensor Assy. (Scanner Tray edge)
527154-2	Sensor Assy. (Tower, Tray, Pump)
527155-1	Scanner (Home) Sensor
527156-1	Door Sensor Assy.
527157-1	Bar Code Reader Assembly
527334-1	Gear Pivot Plate (Plastic Tray Drive Gear)
527352-1	LH End Panel
527358-2	RH End Panel
527410-1	Pump Seal (30 /pkg.)
527461-1	Pivot Plate Assy. (Plastic Gears on Plate)
527493-2	Cover, Heater Pad, SPR Block
527720-2	Incubator Board
527722-4	Scanner Board
527807-1	RS232 Serial Cable - (J7 on Scanner Bd. to terminal cable)
DAS30I-R2.11	Incubator Firmware
DAS31S-R2.22	Scanner Firmware
DAS32S-R2.22	Scanner Firmware